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Supplemental Draft
Environmental Impact Report/Statement

Monterey Peninsula Water Supply Project

VOLUME II

Monterey Peninsula Water Management District

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SEP 09 1991
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U.S. Army Corps of Engineers
Permit Application #16516 S09

August, 1991

Statement A per Telecon
Roger Golden Army
Corps of Engineers
ATTN: CESPN-PE-R
San Francisco, CA 94105

NWW 9/6/91

COVER SHEET

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ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

MONTEREY PENINSULA WATER SUPPLY PROJECT MONTEREY COUNTY, CALIFORNIA

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Abstract:

The Monterey Peninsula Water Management District ~~(MPWMD)~~ in California has examined 10 alternatives with the goal of providing a municipal water supply to the Monterey Peninsula that would provide adequate drought protection for existing residents and meet the long-term water supply needs of planned growth. This EIR/EIS examines the environmental consequences of the 10 project alternatives, including four reservoir sizes at two dam sites on the main stem of the Carmel River, three dam sites on tributaries to the Carmel River, one off-stream reservoir, desalination, and the No Project alternative. (to pg vii)

Review Period:

This Draft EIR/EIS will now undergo a public review period that lasts for 48 days following the notice of this document in the Federal Register on September 6, 1991. Written comments must be submitted to either of the designated lead agency contacts by Wednesday, October 23, 1991 Oral and written comments on this document may also be presented at the MPWMD's public hearings, scheduled for Monday, October 21 at 2:00 p.m. and 7:00 p.m. at the Monterey City Council Chambers. In addition, three public workshops will be held at various locations in the Monterey area during the week of October 7, 1991.

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9. VEGETATION AND TERRESTRIAL WILDLIFE

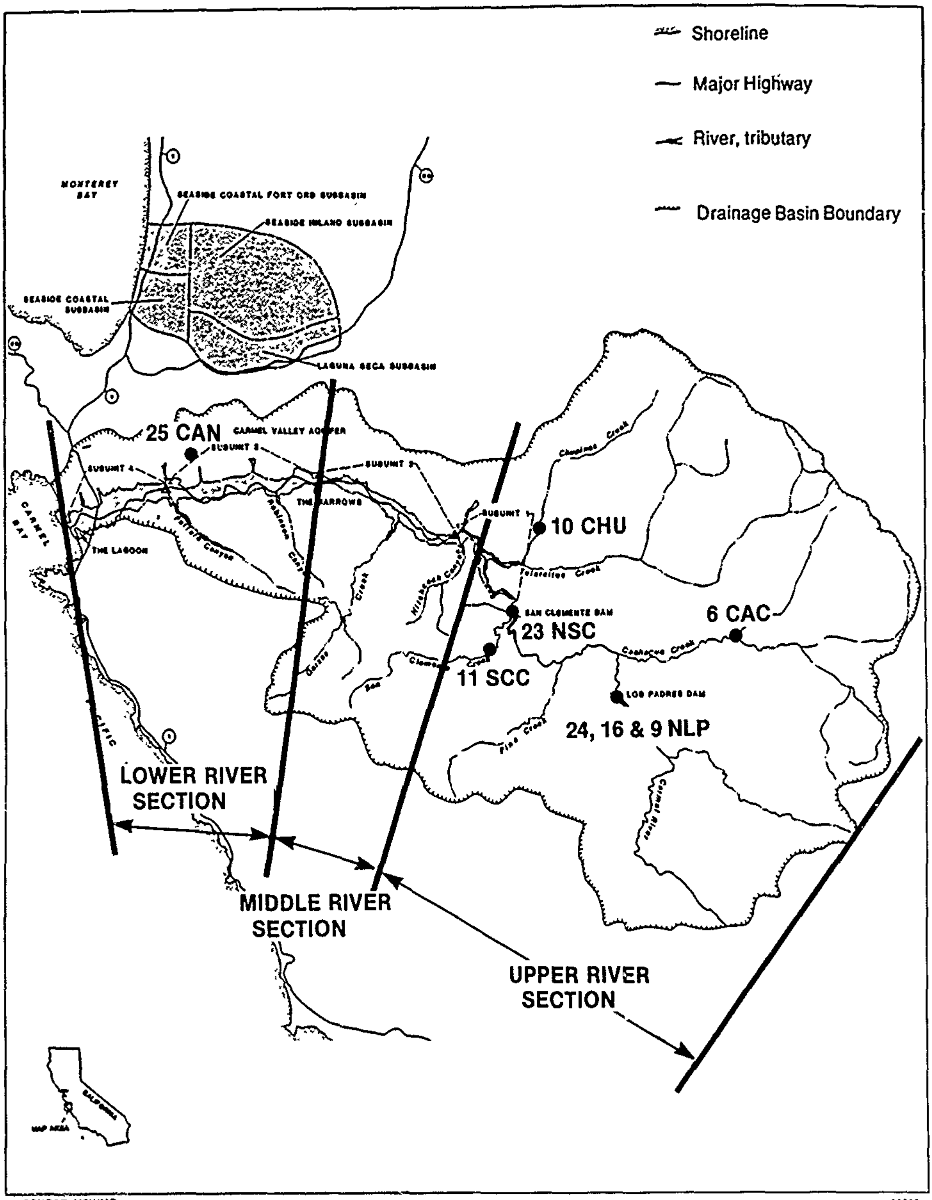
9.1 SETTING

The study area to be discussed in this chapter is that portion of the Carmel River Drainage Basin from approximately 3 miles upriver of the existing Los Padres Dam to the river mouth and those tributaries in which alternative reservoir sites are proposed. The Carmel River Drainage Basin encompasses 255 square miles. The Carmel River is 36 miles long and its headwaters are in the Santa Lucia Mountains. The first 21 miles of the river pass through rugged canyons with steep slopes and small alluvial deposits in the canyon bottoms. The last 15 miles of the river pass through the alluviated Carmel Valley and discharge at its mouth into the Pacific Ocean. In past studies the Carmel River has been divided into three general geographical and physical sections (see Figure 9-1), referred to as the lower (approximately 10 miles), middle (approximately 5 miles) and upper river (approximately 21 miles).[1,2,3] The general vegetation and wildlife habitats associated with the study area have been classified as either riparian forest, woodland, or scrub in the Carmel Valley alluvial flood plain (lower and middle river); the typically narrow riparian-mixed hardwood forest immediately along the river banks upstream of the alluvial plain (upper river), and various brushlands, forests, and woodlands on the steep canyon slopes above the river and tributaries. A detailed description of the vegetation types within each of the alternative reservoir sites is presented in Section 9.1.1 of this chapter. The vegetation community names in ( ) correspond to the description used by the California Department of Fish and Game.[4]

In general, the wildlife in the study area is composed of the common and typical species found in the vegetation types described in Section 9.1.1. A detailed description of wildlife identified during field surveys at each of the alternative sites in the study area is provided in Section 9.1.2 below. Complete lists of plant and wildlife species identified in the study area are provided in Appendix 9-A and 9-B. Two desalination plant sites are also examined; please refer to Figure 4-7 for the locations of these sites.

CARMEL RIVER DRAINAGE BASIN

FIGURE 9-1



SOURCE: MPWMD

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9.1.1 VEGETATION

9.1.1.1 Upper River Section

The upper river section of the Carmel River Drainage Basin is defined here as the upper 21 miles of the Carmel River located upstream of the Camp Stephani area, and those alternative project sites on the tributaries of this stretch of the river, except for the Chupines Creek alternative site (see Figure 9-1). The New Los Padres, New San Clemente, San Clemente Creek and the Cachagua Creek Reservoir alternative sites all occur within this upper section of the Carmel River Drainage Basin. The principal vegetation types in this section of the river are very similar, and thus the descriptions below apply to the four alternative sites noted above. These vegetation types at each alternative site in the upper river drainage basin are mapped in Figures 9-2 through 9-5.

Riparian

This vegetation type is limited to the canyon bottoms that are filled with recently deposited gravel and sand between 6 and 15 feet deep, and are immediately adjacent to the canyon slopes. In New Los Padres and the New San Clemente alternative sites along the Carmel River, this vegetation type averages approximately 100 to 150 feet wide. In the San Clemente Creek and Cachagua Creek sites this vegetation type is much narrower. The vegetation structure is highly variable, ranging from typical forest communities with a tree overstory and a brush and herbaceous understory, to woodland or scrub communities of open stands of scattered trees with little understory, to dry washes with very little or no vegetation cover.

A variety of riparian forest communities may be identified within the riparian zone in this portion of the Carmel River Basin. The dominant riparian forest community is a mixture of the riparian community and the adjacent mixed hardwood forest (Central Coast Cottonwood-Sycamore Riparian Forest). The dominant tree species are sycamore (*Plantanus racemosa*), cottonwood (*Populus trichocarpa*), white alder (*Alnus rhombifolia*), and willows (*Salix* spp.) of the riparian community, and coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), and California buckeye (*Aesculus californicus*) of the mixed hardwood forest community. The brush understory is typically composed of poison oak (*Toxicodendron diversilobum*), coffeeberry (*Rhamnus californica*), wild current (*Ribes* spp.), blackberry (*Rubus vitifolius*), and stinging nettle (*Urtica holosericea*).

In some areas the riparian forest community is dominated by particular species, such as the white alders (White Alder Riparian Forest), located along those areas of the creeks and Carmel River where the water flow is rapid and the channel bed is composed of very coarse materials. In the drier outer floodplains along these waterways, the coast live oak may dominate (Central Coast Live Oak Riparian Forest). In sandy or gravelly soils, the Arroyo Willow (*Salix lasiolepis*) dominates as a low, dense, closed canopy forest (Central Coast Arroyo Willow Riparian Forest).

Redwood

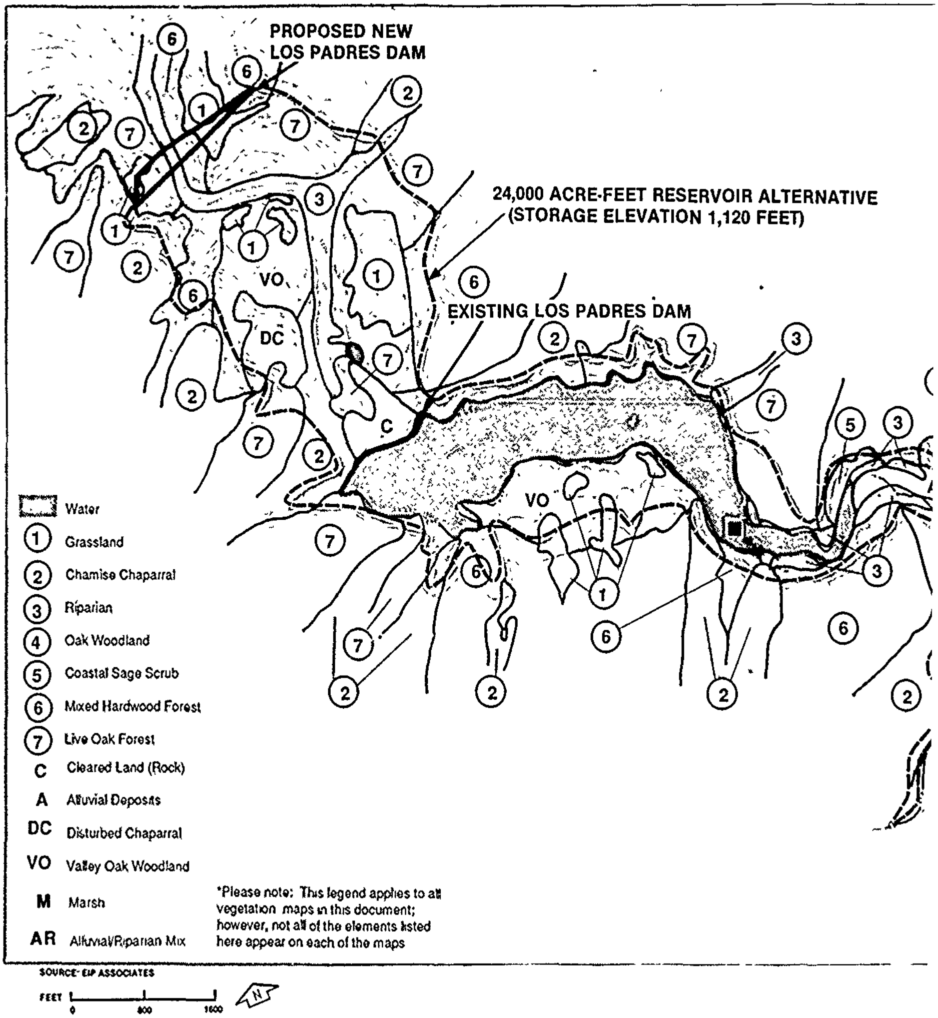
Of particular interest are small stands of redwood trees (*Sequoia sempervirens*) spotted along San Clemente Creek in the New San Clemente Reservoir site and along Finch Creek in the Cachagua Creek Reservoir site (North Coast Alluvial Redwood Forest). These stands of trees are on alluvial flats with deep well-drained soils and typically occur where summer fogs are frequent. These stands range in size from less than 10 trees to more than 50 trees. The largest stands are along San Clemente Creek at about the 900-foot elevation (see Figure 9-5) and along Finch Creek (see Figure 9-4). The brush and herbaceous understory is rather limited under these redwoods due to the dense canopy cover and thick layer of duff on the ground. Because of this unique habitat, the vegetation associated with these redwood stands is unique when compared to the much more extensive Mixed Hardwood Forest and Oak Woodland communities in the study area.

Mixed Hardwood Forest (Broadleafed Upland Forest)

This forest-type range extends into the North Coast Ranges as fragmented transitions between the Douglas Fir (*Pseudotsuga menziesii*)-Hardwood Forests and Northern Oak Woodlands and as far south as San Diego County, where it is typically restricted to mesic slopes. In the Santa Lucia Range this forest community is typically a part of a mosaic composed of oak woodlands, coastal sage scrub, chaparral, and grasslands. In the upper Carmel River Basin this community is typically found on the wetter north- and east-facing slopes. The dominant tree and brush species within this plant community are madrone (*Arbutus menziesii*) and the coast live oak. Black oak (*Q. kelloggii*) and valley oak (*Q. lobata*) are scattered within this community, along with colonies of the California buckeye (*Aesculus californica*). Creambush (*Holodiscus discolor*) and creeping snowberry (*Symphoricarpos mollis*) are common understory shrubs. The big-leaf maple (*Acer macrophyllum*)

(1)

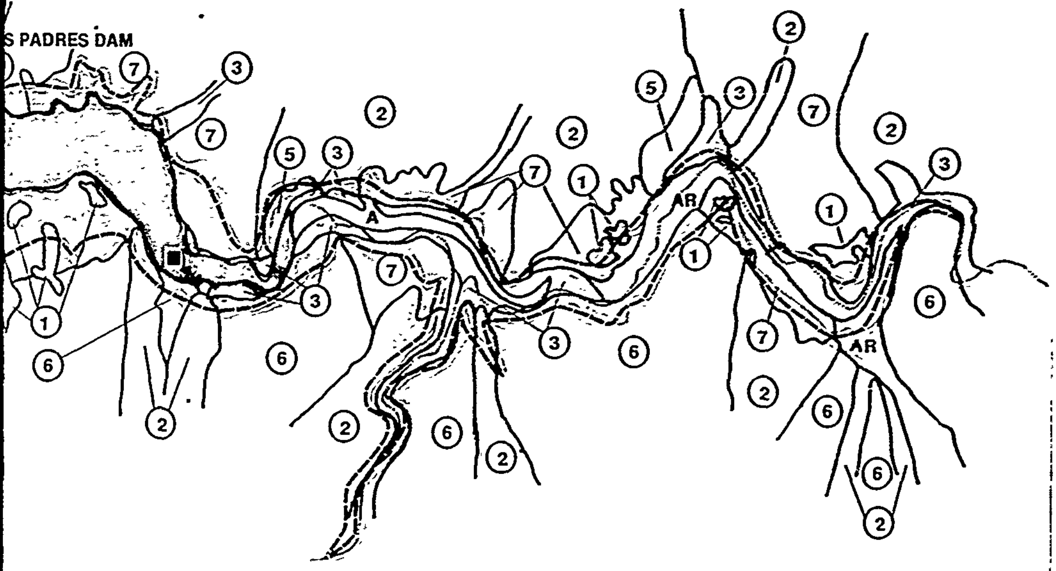
MAP OF VEGETATION, NEW LOS PADRES RESERVOIR



(2)

FIGURE 9-2A

CRE-FEET RESERVOIR ALTERNATIVE
AGE ELEVATION 1,120 FEET)



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(1)

MAP OF VEGETATION, NEW LOS PADRES RESERVOIR

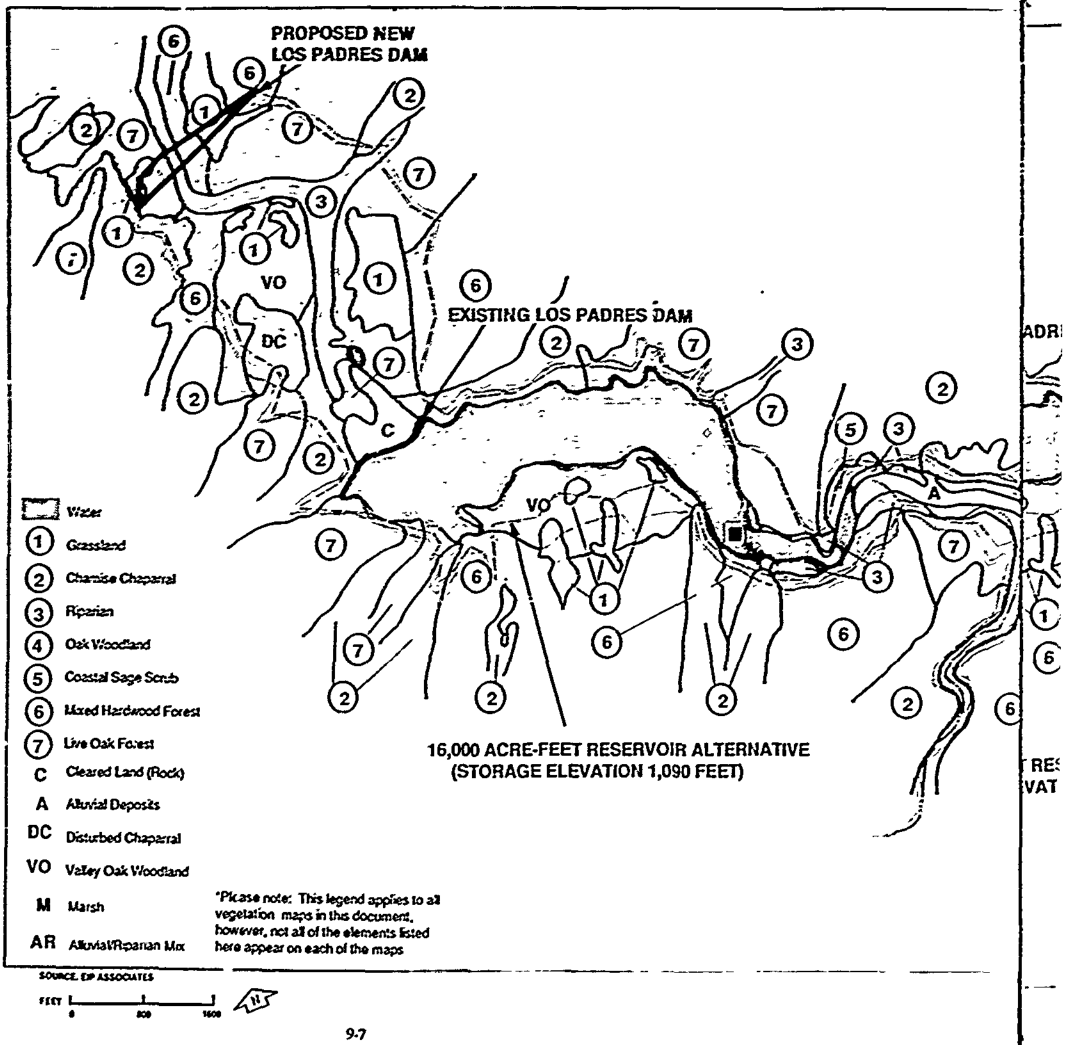
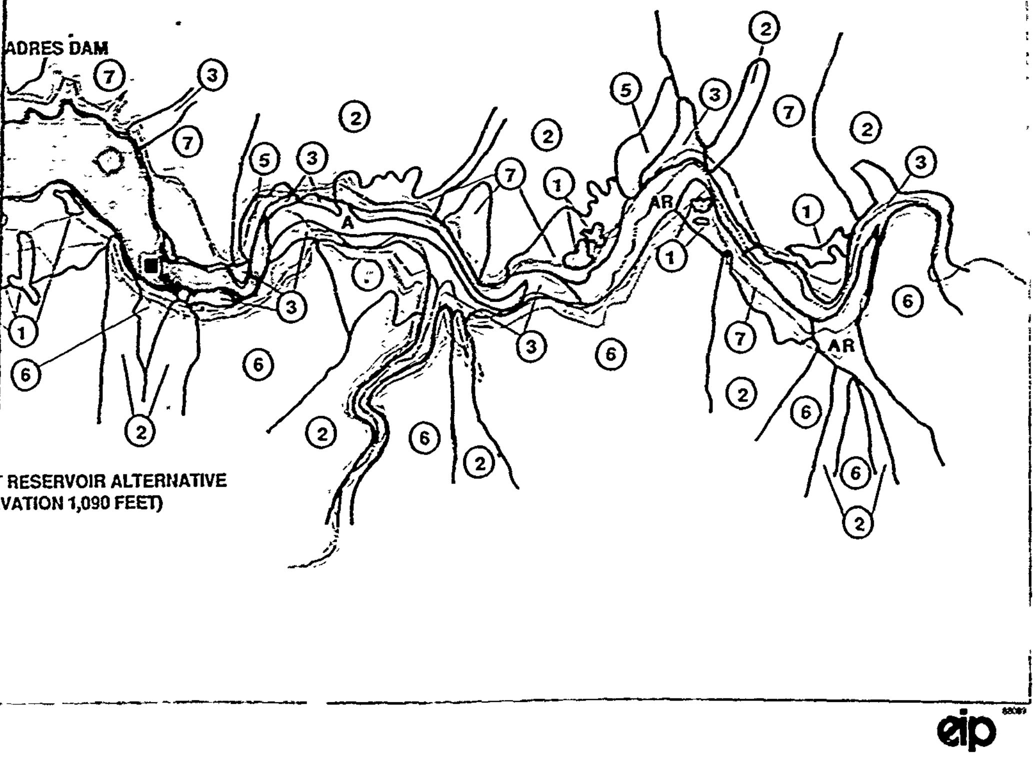


FIGURE 9-2B



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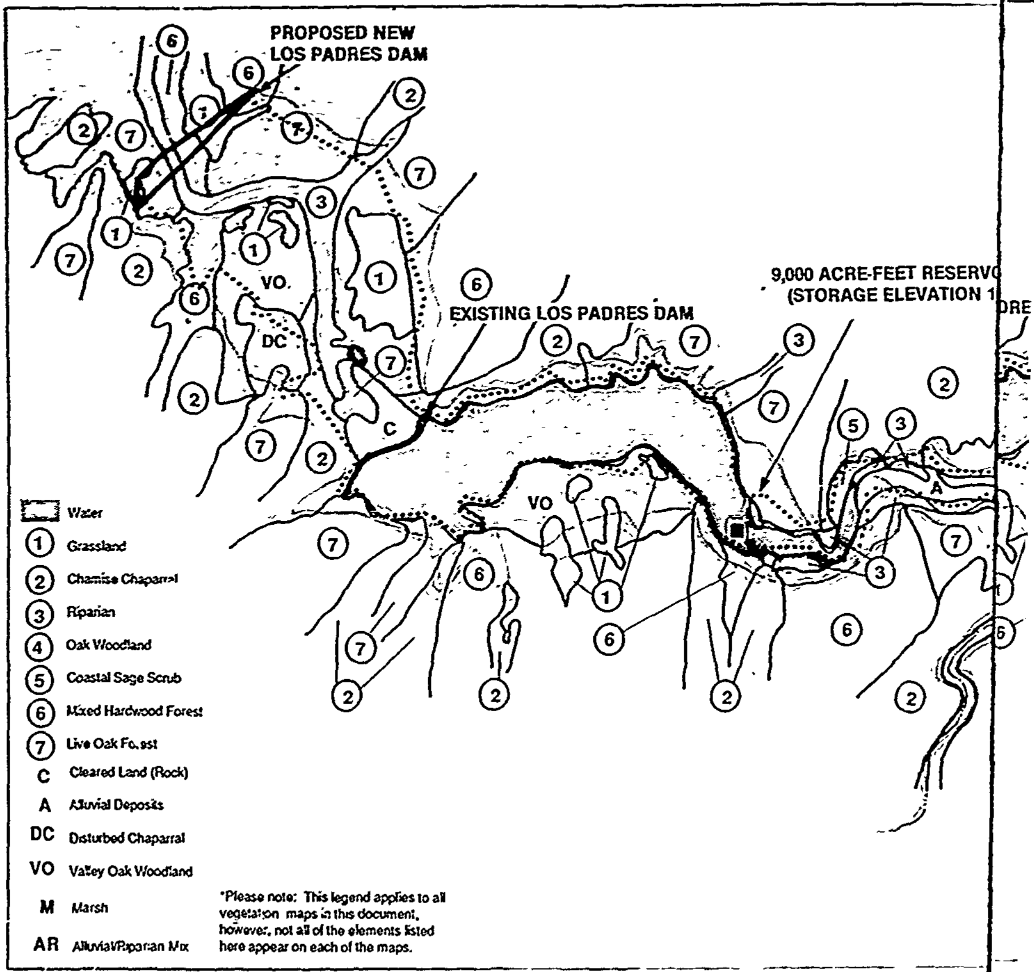
1

MAP OF VEGETATION, NEW LOS PADRES RESERVOIR

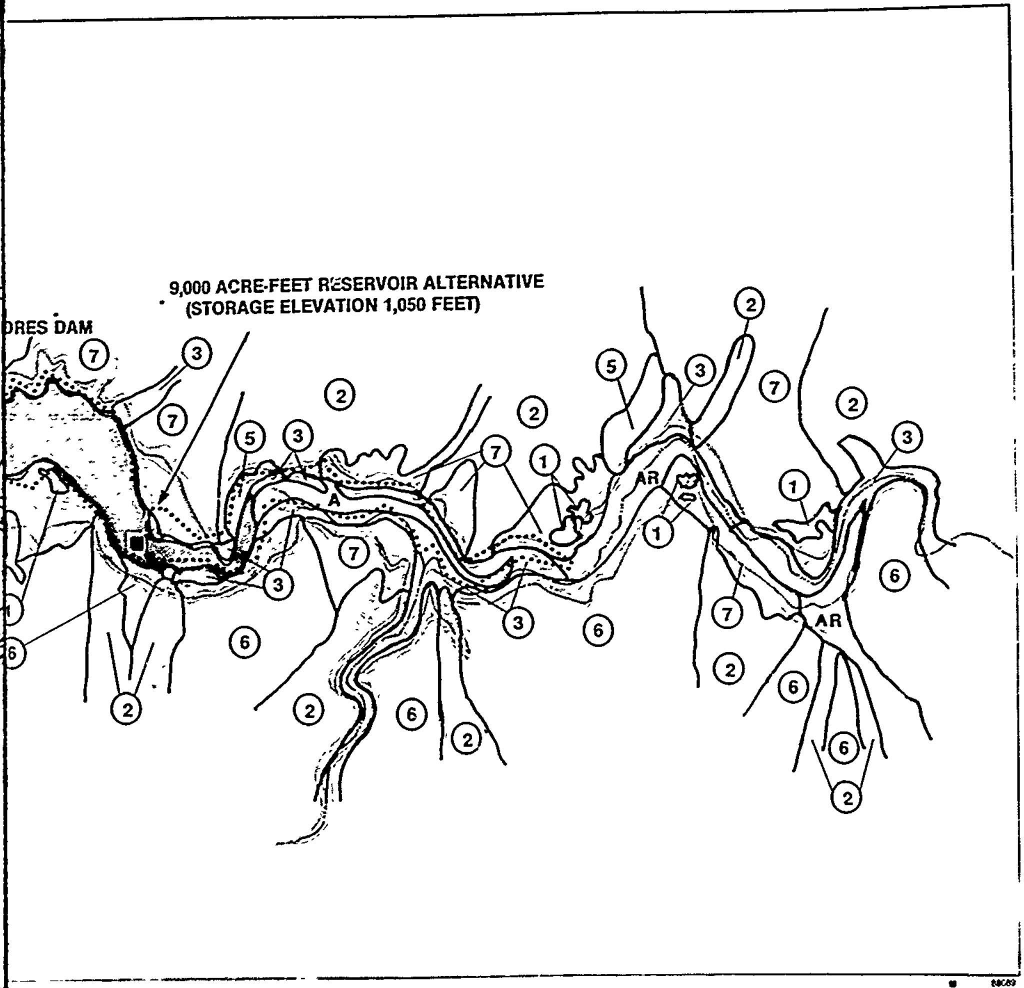


SOURCE: EIP ASSOCIATES

FEET 0 800 1600

2

FIGURE 9-2C



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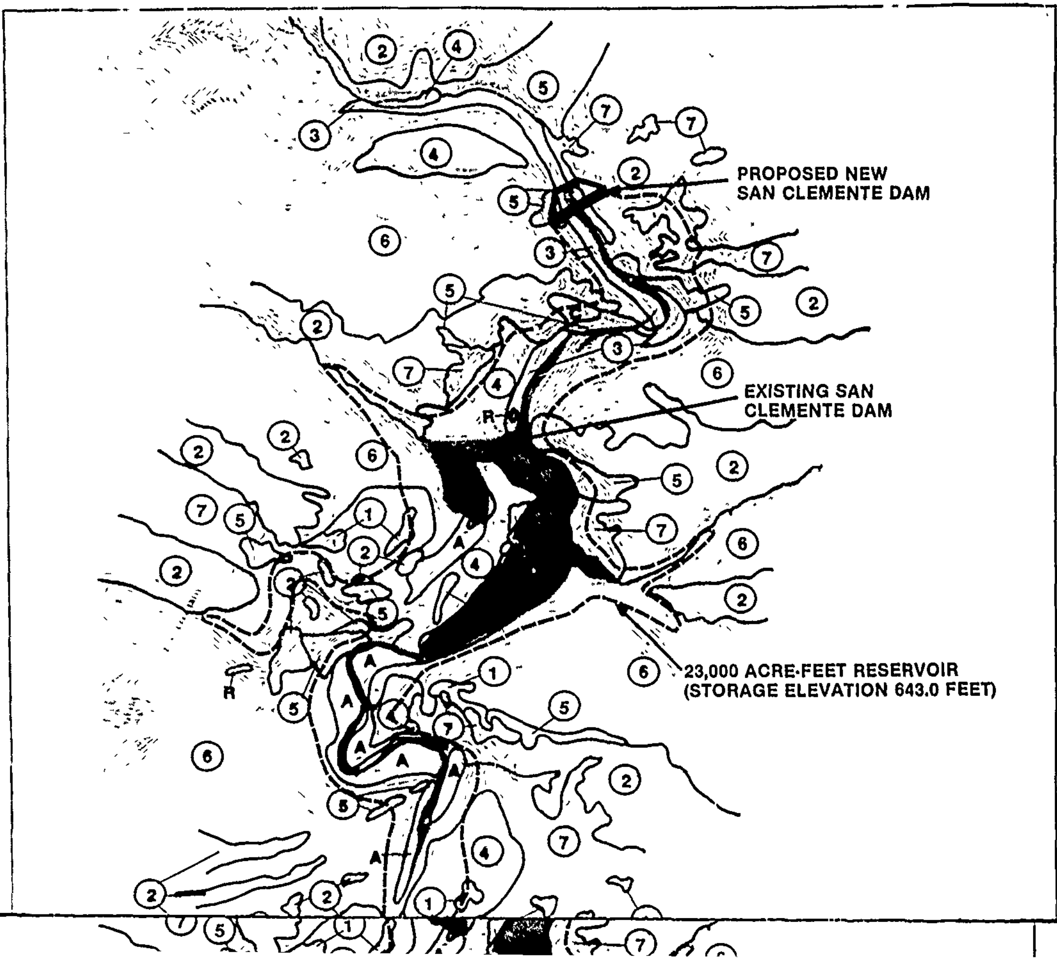
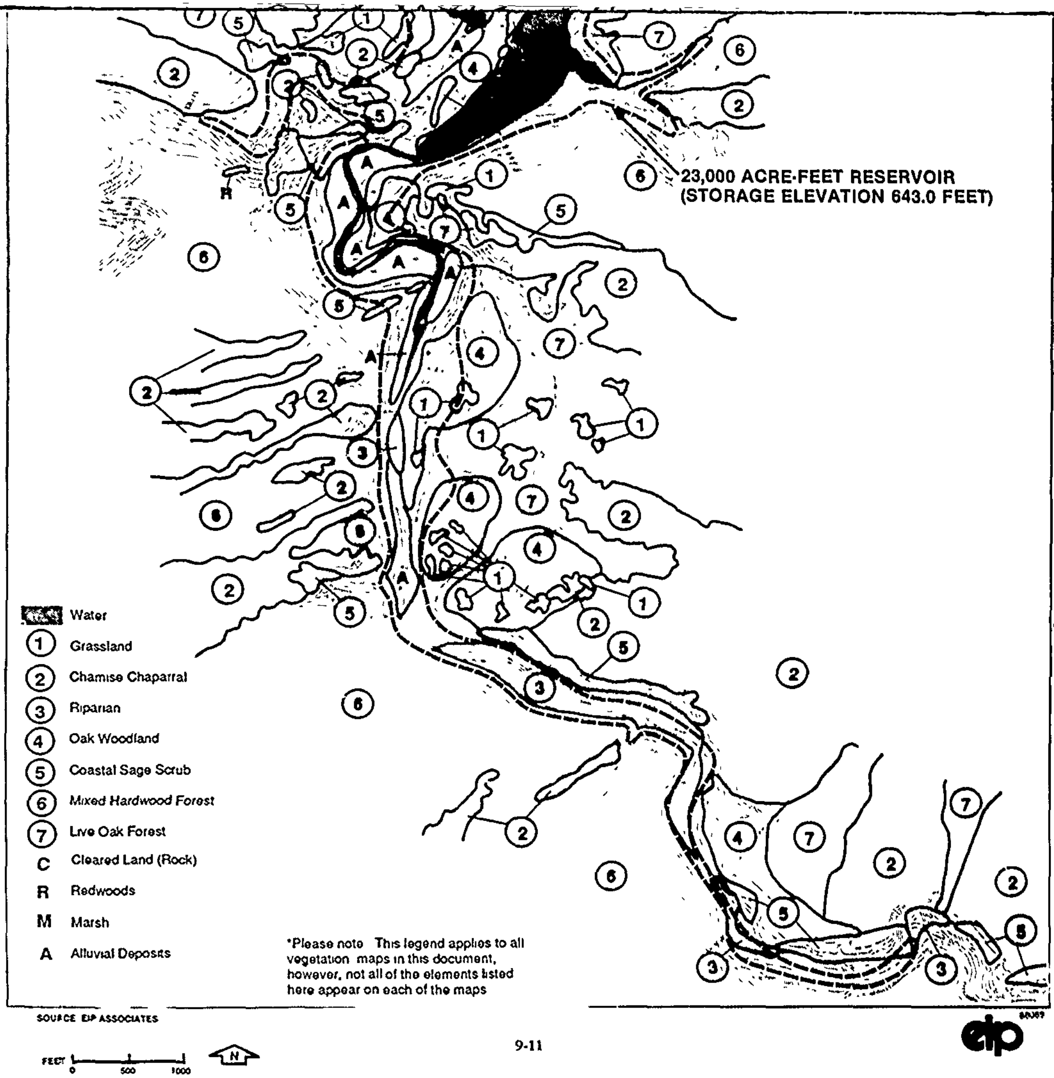
MAP OF VEGETATION, NEW SAN CLEMENTE RESERVOIR

FIGURE 9-3

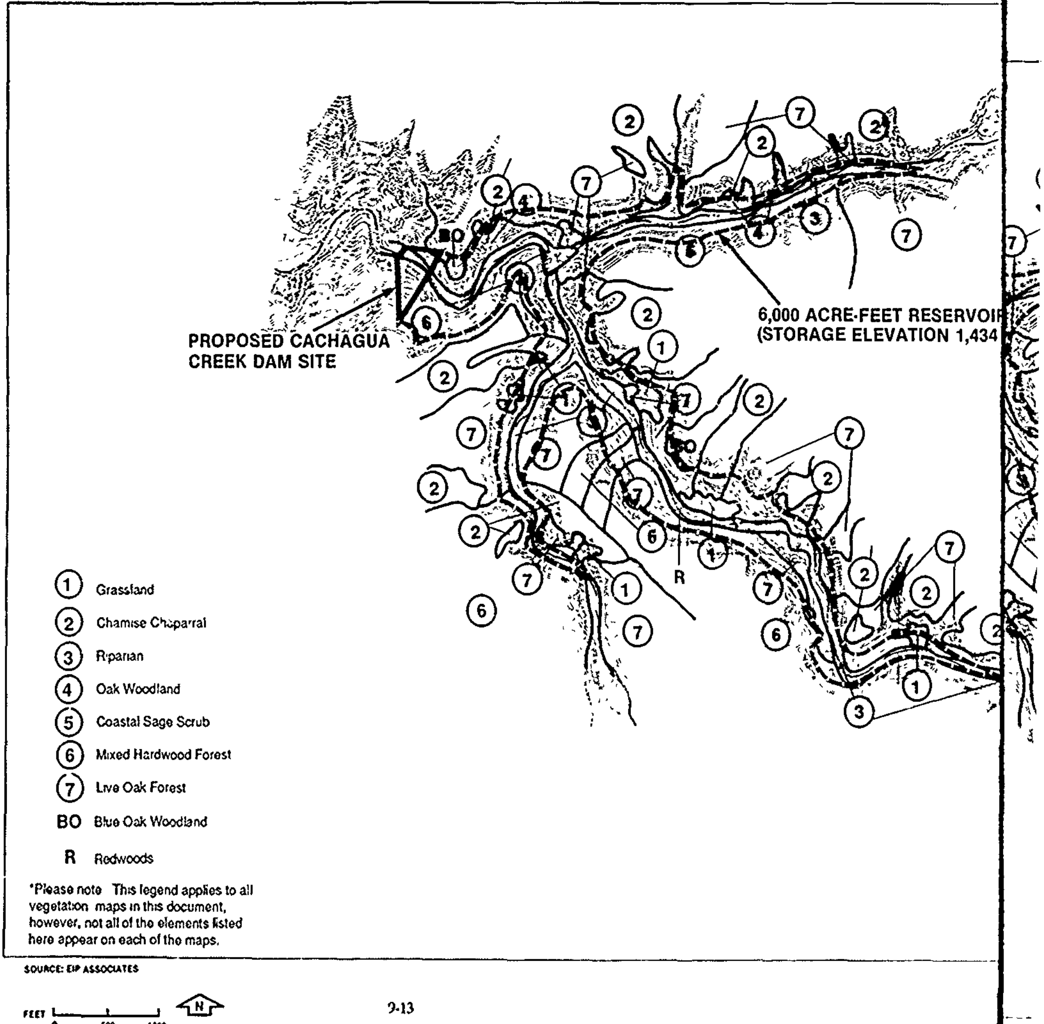


1


23,000 ACRE-FEET RESERVOIR
(STORAGE ELEVATION 643.0 FEET)
Water
1 Grassland
2 Chamise Chaparral
3 Riparian
4 Oak Woodland
5 Coastal Sage Scrub
6 Mixed Hardwood Forest
7 Live Oak Forest
C Cleared Land (Rock)
R Redwoods
M Marsh
A Alluvial Deposits
*Please note This legend applies to all vegetation maps in this document, however, not all of the elements listed here appear on each of the maps
SOURCE EIP ASSOCIATES
FEET 0 500 1000
N
eip

1

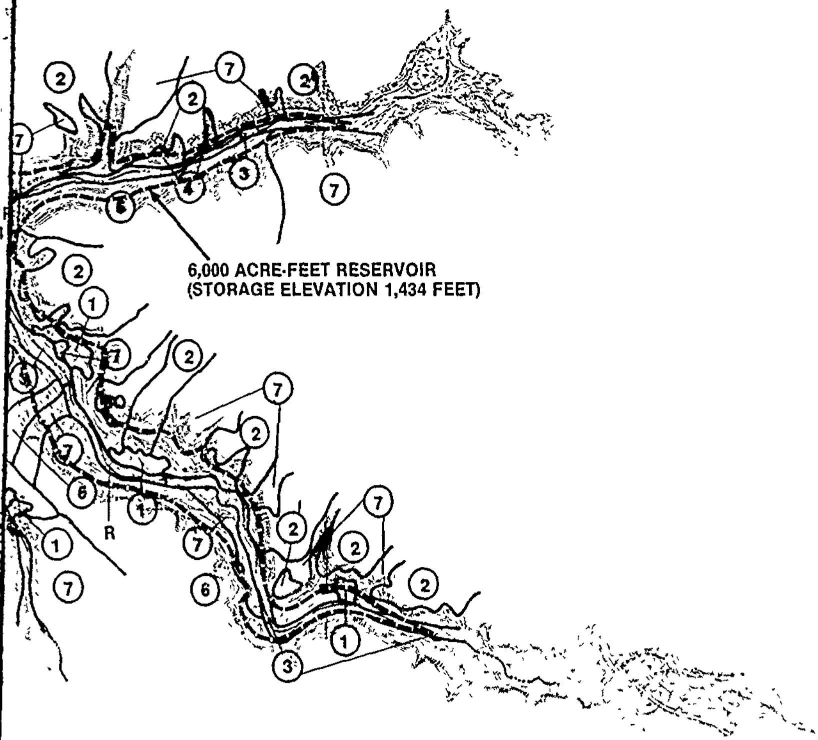
MAP OF VEGETATION, CACHAGUA CREEK RESERVOIR



SOURCE: EIP ASSOCIATES

2

FIGURE 9-4



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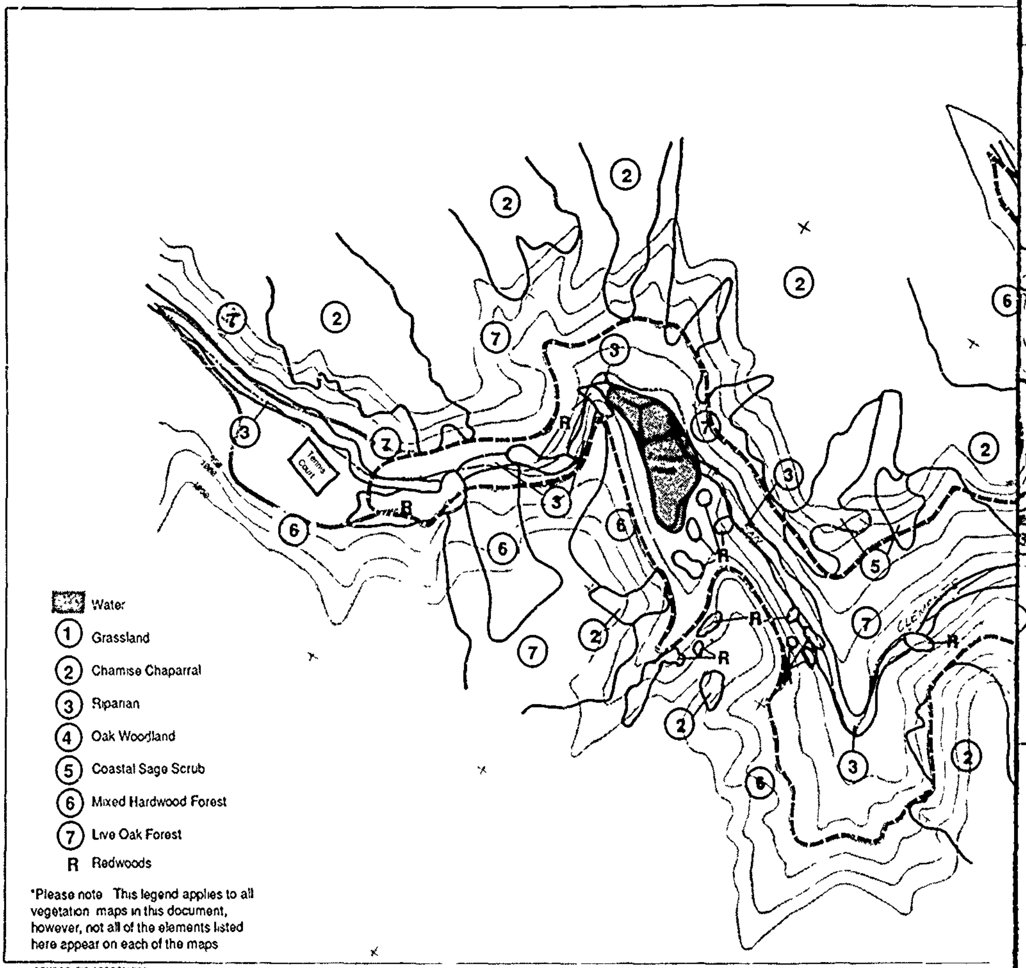
1

MAP OF VEGETATION, SAN CLEMENTE CREEK RESERVOIR

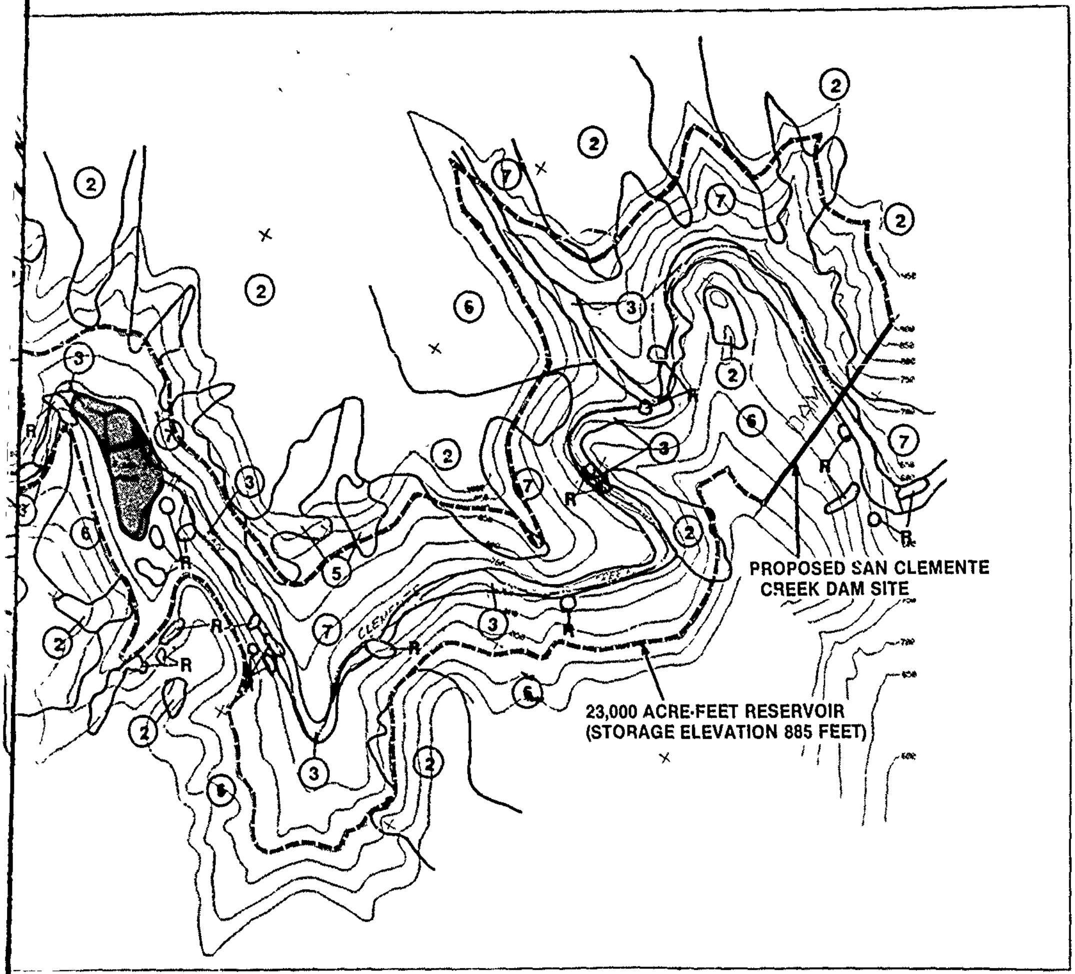


SOURCE. EIP ASSOCIATES

FEET 0 250 500

2

FIGURE 9-5


PROPOSED SAN CLEMENTE
CREEK DAM SITE
23,000 ACRE-FEET RESERVOIR
(STORAGE ELEVATION 885 FEET)
DAM
CLEMENTE
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occurs both in the riparian zone and on the wetter sites up the slope in the Mixed Hardwood Forest. Mature trees stand 100 feet tall or more and occur in dense stands with 70-100 percent canopy cover.

On the dryer south- and west-facing slopes, the coast live oak becomes more of a dominant species with the California bay and California buckeye (elements of the Mixed Hardwood Forest) scattered among the oaks. Various brush species from the adjacent coastal scrub and chaparral communities make up the understory in areas (Coast Live Oak Forest). This community represents a transition from the more mesic sites of the Mixed Hardwood Forest and the dryer sites of the Oak Woodland types. The Coast Live Oak Forest is common on the north- and west-facing slopes of the San Clemente Creek, New San Clemente, Cachagua Creek and New Los Padres alternative sites. The coast live oak occurs in pure stands on some of the shady alluvial terraces and in the transition zones between the Mixed Hardwood Forest and the Coastal Live Oak Woodland.

The California bay is scattered throughout the Mixed Hardwood Forest, but it achieves total dominance in localized areas (California Bay Forest). These bay forests have little or no understory. Redwood trees are found in small stands up on the north-facing slopes of the San Clemente Creek site (Upland Redwood Forest). These stands are similar to the Alluvial Redwood Forest and occur on shallow well-drained soils.

Foothill Woodland (Oak Woodland)

On the drier sites on the south- and west-facing slopes and on the more level topographic areas of old alluvial terraces, many of the tree species of the Mixed Hardwood Forest thin out, and various oaks (*Quercus* spp.) dominate. This community is very similar to the Mixed Hardwood and Coast Live Oak Forests. The basic differences between these communities are that the canopy densities of the Oak Woodlands are less (30-70 percent) than in the Forest (70-100 percent) and brush cover is often less in the woodlands than in the forests. These woodlands often appear as open savannah-like areas with grasslands between the trees.

Three types of oak woodlands occur in the upper section of the Carmel River Basin: Valley Oak (*Quercus lobata*), Blue Oak (*Q. douglasii*) and Coast Live Oak Woodlands. The Coast Live Oak Woodland community is very similar to the Coast Live Oak Forests, and in many cases these two

communities merge into an indistinguishable mosaic. It intergrades with the Coast Live Oak Forest on the more mesic sites and with the Coastal Scrub and Chaparral on the drier sites.

The Valley Oak Woodlands are limited in extent to the old alluvial terraces along the Carmel River at the New Los Padres and San Clemente sites. This community is more open and park-like with a grassy understory.

A couple of small blue oak woodlands occur within the Cachagua Creek site. Studies at the nearby University Of California, Hastings Natural History Reservation indicate that regeneration of the blue oak in this region has been very poor over the past 50 years.[5]

Grasslands

This a naturalized plant community dominated by nonnative annual grasses and forbs (wildflowers). This annual grassland community has effectively replaced the native perennial grassland community in California. The native perennial bunch grasslands have been significantly limited as a result of livestock grazing practices in the state and through the introduction of annual grasses and forbs from other Mediterranean regions in the world. These "new natives" are now so extensive and well established in the state that it is now considered as a naturalized climax community in California.[6]

The annual grasslands vary in composition and cover depending upon soil nutrients, moisture content, aspect, and/or other special ecological factors such as grazing pressure. In general, areas dominated by forbs indicate an early successional stage of development, while a dense stand of tall grasses represents the climax stage. Annual grasslands may range from dense (100 percent) to sparse cover, and from 6 inches to 3 feet in height. The soils are generally medium to heavy in texture, granular in structure, moderate in organic content, and often 1-2 feet in depth. This herbaceous community intergrades with the Oak Woodlands and Brushland communities in this region. The common and typical plant species include wild oats (*Avena* spp.), rye grass (*Lolium* spp.), barley (*Hordium* spp.), brome (*Bromus* spp.), fileree (*Erodium* spp.), California poppy (*Eschscholzia californica*), tarweed (*Hemizonia* spp.), lupines (*Lupinus* spp.), sweet clover (*Medicago polymorpha*), owls clover (*Orthocarpus* spp.), and fescue grass (*Festuca* spp.).

Brushlands

On the dryer south- and west-facing slopes of the canyons, the vegetation is dominated by brushlands with occasional pockets of oak trees near the adjacent Mixed Hardwood Forest and Oak Woodlands. These brushlands, typical of regions with Mediterranean-like climates, may extend from the ridgetops down to the riparian zone along the river and its tributaries. Two types of brushland occur on the slopes in the Upper section of the Carmel River Basin -- Coastal sage scrub, or "soft" chaparral, and chamise chaparral, or "hard" chaparral.

The Coastal Sage Scrub (Diablan Sage Scrub) community is limited in extent in the New San Clemente, San Clemente Creek and New Los Padres alternative reservoir sites, and occurs in very limited amounts in the Cachagua site. In this area it is found on the steep slopes with the shallowest and rockiest soils. The brush is 1 to 5 feet tall, and because of the rocky ground, forms a more open community. This vegetation is sometimes referred to as "soft chaparral" because many of its dominant species are not as woody or as large as the chamise chaparral. The dominant species include California coastal sage (*Artemisia californica*), black sage (*Salvia mellifera*) and Northern monkeyflower (*Mimulus aurantiacus*).

Chamise chaparral or "hard" chaparral (Northern Mixed Chaparral) is a dense, often impenetrable brushland of 3 to 10 feet in height. In the upper Carmel River Basin area, it is the most prevalent brushland community, with chamise (*Adenostomu fasciculatum*) as the most dominant plant, forming pure stands in some sites. Other common species include wild mountain lilac (*Ceanothus* spp.), toyon (*Heteromeles arbutifolia*) and chaparral honeysuckle (*Lonicera interrupta*).

Freshwater marsh vegetation forms dense patches of herbaceous vegetation in ponds and along slow moving portions of rivers, creeks, and streams. Dominant species include cattails (*Typha* spp.), tules and bulrushes (*Scirpus* spp.), rushes (*Juncus* spp.), and sedges (*Carex* spp.). Shrub and tree willows (*Salix* spp.) may be found along the shoreline where conditions are suitable. As sedimentation continues, marsh vegetation will expand into the reservoir. Marsh vegetation is found in Los Padres and San Clemente reservoirs and is referred to as pond or freshwater emergent vegetation elsewhere in this report.

9.1.1.2 Lower and Middle River Section

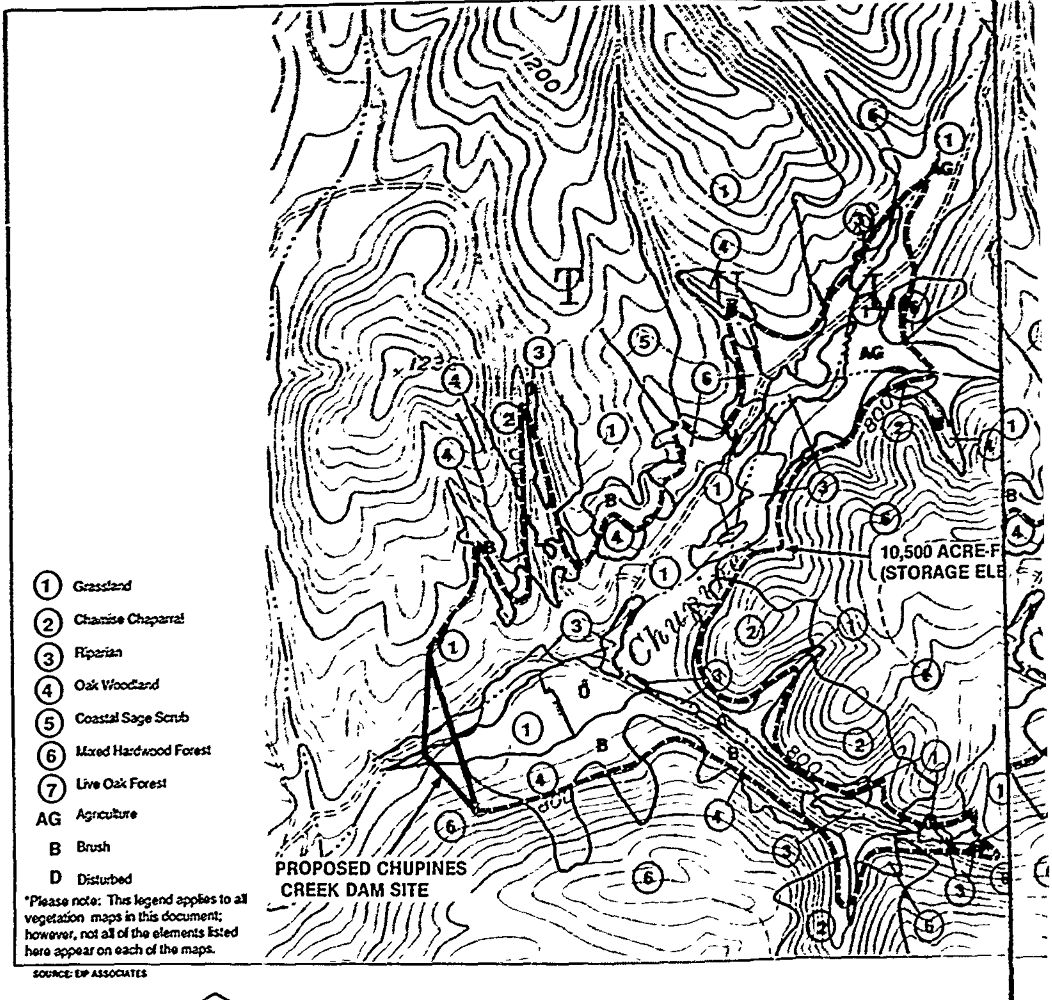
The vegetation communities typical of this section of the Carmel River Drainage Basin are typical of large river alluvial flood plains in the central coast region. The actual study area includes that portion of the Carmel River from Camp Stephani to the mouth of the river, and the Chupines Creek and Cañada Reservoir sites (see Figure 9-1). Although the Chupines Creek site is geographically located in the upper section of the river basin, it is included in this discussion because it is located in a tributary valley with similar characteristics to the lower and middle section of the Carmel River. Descriptions of the vegetation communities at both the Chupines and Cañada sites are presented below.

Chupines Creek Reservoir Site

The vegetation communities located within the inundation area of this alternative reservoir site are similar to those described above (see Figure 9-6). It differs from the previous sites in that the valley bottom is defined by a broad alluvial plain ranging in width from 500 to 1,000 feet. This site also differs in that a good portion of the valley bottom has been altered or disturbed with agricultural activities. At the present time there is a ranch in the valley bottom with associated stables, barns and sheds. Portions of the site are used for pasture as well. The dominant vegetation types in the valley bottom are annual grasslands and plowed fields. At the time the field surveys were conducted, these fields were fallow and the annual grassland species were repopulating the area. The grasslands spread up into the surrounding hillsides in areas of this site.

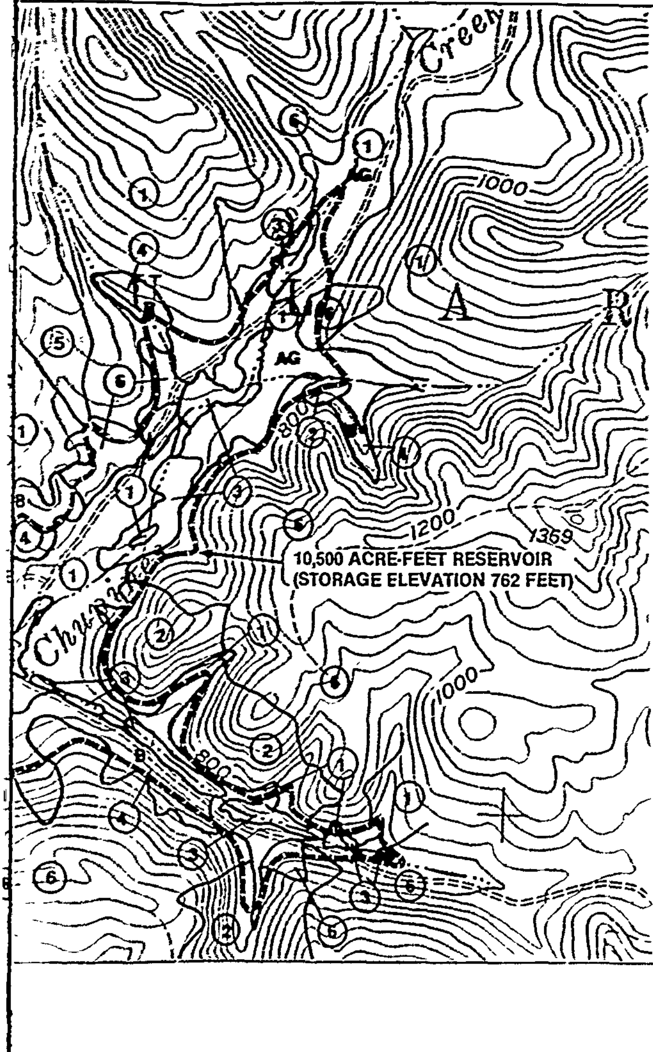
The existing riparian habitats on this site are dominated by a narrow strip of vegetation immediately next to the creek channel downstream of the ranch and in the tributaries. This vegetation strip is dominated by coast live oaks (Central Coast Live Oak Riparian Forest), with scattered California buckeyes from the adjacent Mixed Hardwood Forest type. The understory varies from scattered bushes beneath the tree canopies to thickets of Pacific blackberry (*Rubus ursinus*) and/or California wild rose (*Rosa californica*) in the canopy openings. Upstream of the ranch, the riparian vegetation occurs in broader strips and is much more diverse, with black cottonwoods (*Populus tricocarpa*), willows (*Salix* spp.) and Western sycamores (*Plantanus racemosa*) (Central Coast Cottonwood-Sycamore Riparian Forest). Large valley oak and sycamore trees are scattered in the adjacent grasslands suggesting that a much larger riparian forest once spread across this valley floor. Other

MAP OF VEGETATION, CHUPINES CREEK RESERVOIR



2

FIGURE 9-6



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vegetation communities on this site – Coastal Scrub, Chamise Chaparral, Mixed Hardwood Forest, and Oak Woodlands – are similar in nature and structure to the communities described for the upper section of the Carmel River Drainage Basin.

Cañada Reservoir Site.[7]

Seven predominant native habitat types within the Cañada Reservoir were identified in the project study area, including Monterey pine forest, coast live oak forest, buckeye woodland, coastal scrub, mixed chaparral, coastal prairie, and riparian forest. These habitat types are "native" in the sense that they are relatively unaffected by recent large-scale human disturbance. Three other habitat types that occur in the project area – disturbed grassland, farmland, and old dwelling site – are associated with ongoing or past intensive human disturbance.

Brief descriptions of all the habitat types occurring within the project area are given below. Refer to the Biological Assessment prepared for the site for more detailed descriptions.[8] Areas transitional between two habitat types which are extensive enough to be mapped separately are also briefly described. The distribution and extent of vegetation/habitat types in the Cañada Reservoir Project study area are presented in Figure 9-7.

Monterey Pine Forest. The Monterey pine forest is a relatively dense forest dominated by Monterey pine (*Pinus radiata*). Coast live oak (*Quercus agrifolia*) is the only associated tree species. Several shrub species, including poison oak (*Toxicodendron diversilobum*), evergreen huckleberry (*Vaccinium ovatum*), coffeeberry (*Rhamnus californica*), and ocean spray (*Holodiscus discolor*), are locally moderately abundant in the understory, along with the semi-woody vines, hairy honeysuckle (*Lonicera hispidula* var. *vacillans*) and Pacific blackberry (*Rubus ursinus*). Although a relatively large number of herbaceous species occur in small numbers in the Monterey pine forest, the herbaceous understory is generally sparse and poorly developed except in relatively open areas, where it is similar to that of the coast live oak woodland. In the project area, Monterey pine forest generally occurs in more protected localities on slopes and in the bottoms of small canyons. Extensive stands of Monterey pine forest occur on the generally east-facing slopes of the western half of the project area, north of the proposed dam site.

Monterey pine forest is a habitat type of very limited distribution, occurring in only three widely separated areas near the Central California coast: the Monterey Peninsula, near Cambria in San Luis Obispo County, and near Swanton and Ano Nuevo Point in Santa Cruz and San Mateo Counties. The Monterey pine forest stands in the project area are near the eastern (inland) limits for Monterey pine on the Monterey Peninsula, perhaps accounted by the tendency of Monterey pine to occur in relatively moist, protected localities within the project area. Stands of Monterey pine are generally even-aged and date from past fires, because the cones largely remain closed until they are induced to open by heat, making abundant reproduction dependent on periodic fire.

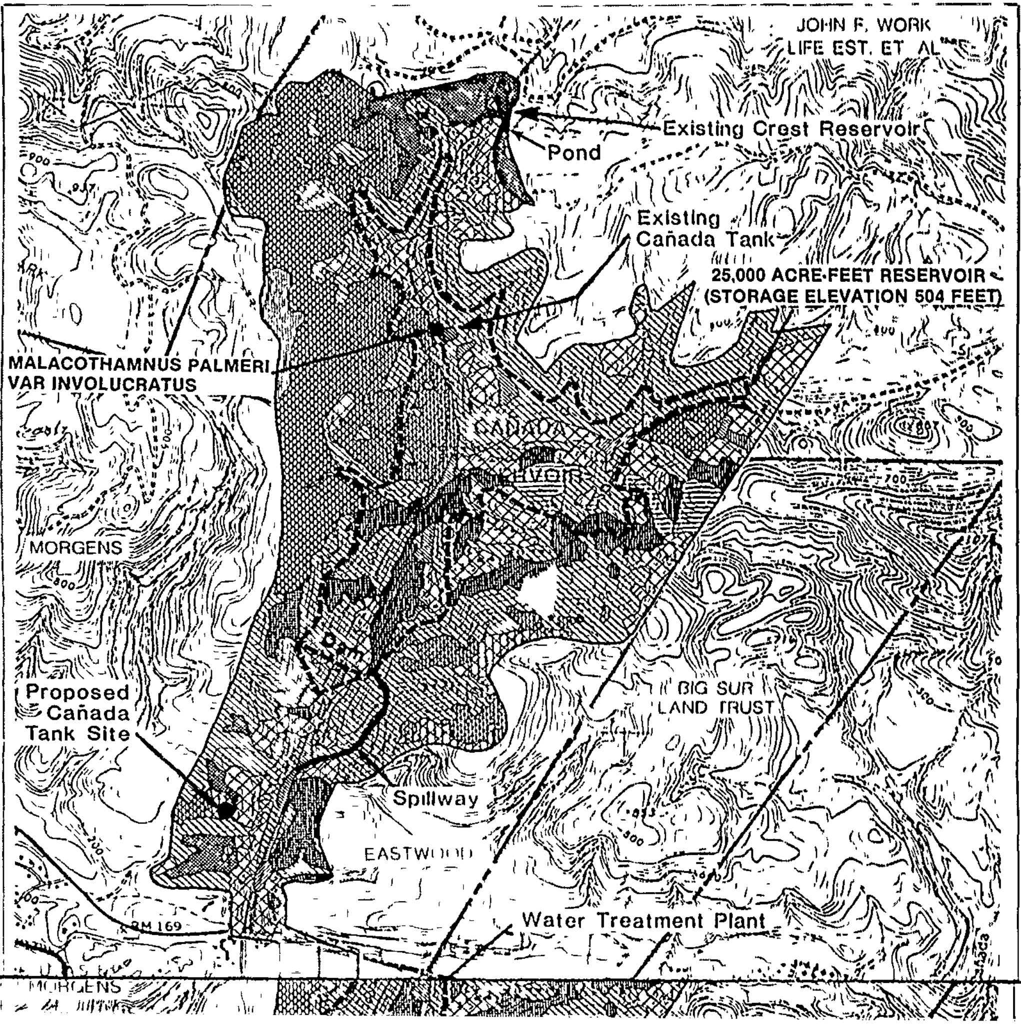
Although Monterey pine is widely planted as an ornamental and forms naturalized stands along much of the California coast, native Monterey pine forest stands are a sensitive habitat type (high-priority habitats with the California Natural Diversity Data Base (CNDDB) and listed by the California Natural Heritage program as endangered and of limited distribution in California) because they are of limited occurrence in only three areas and because urbanization and, to some extent, clearing for pasture have reduced their extent. Loss of native Monterey pine forest to urbanization has been especially severe in the Monterey Peninsula stands.

Coast Live Oak Forest (Coast live oak woodland, coast live oak forest, and central coast live oak riparian forest). The coast live oak woodland and coast live oak forest are very similar, differing mainly in the canopy density of the dominant tree species, coast live oak. Since the canopy density in coast live oak-dominated habitats within the project area varies greatly over short distances/without sharp discontinuity, we do not distinguish between these two habitat types. Locally, where the coast live oak forest extends to the bottom of the main north-south canyon in the project area, it corresponds to the central coast live oak riparian forest; however, this canyon bottom live oak forest is continuous with the forest on the adjacent slopes. Coast live oak forms pure stands in some areas, in other areas it is associated with such other tree species as Monterey pine, California buckeye (*Aesculus californica*), and California bay (*Umbellularia californica*). The shrub layer is quite variable, ranging from almost nonexistent (where the canopy cover is high) to locally dense.

Monterey Pine/Coast Live Oak Forest. This habitat type is transitional between Monterey pine forest and coast live oak forest. It is a rather dense to somewhat open forest with Monterey pine

VEGETATION/HABITAT TYPES WITHIN THE CANADA RESERVOIR
PROJECT STUDY AREA

FIGURE 9-7



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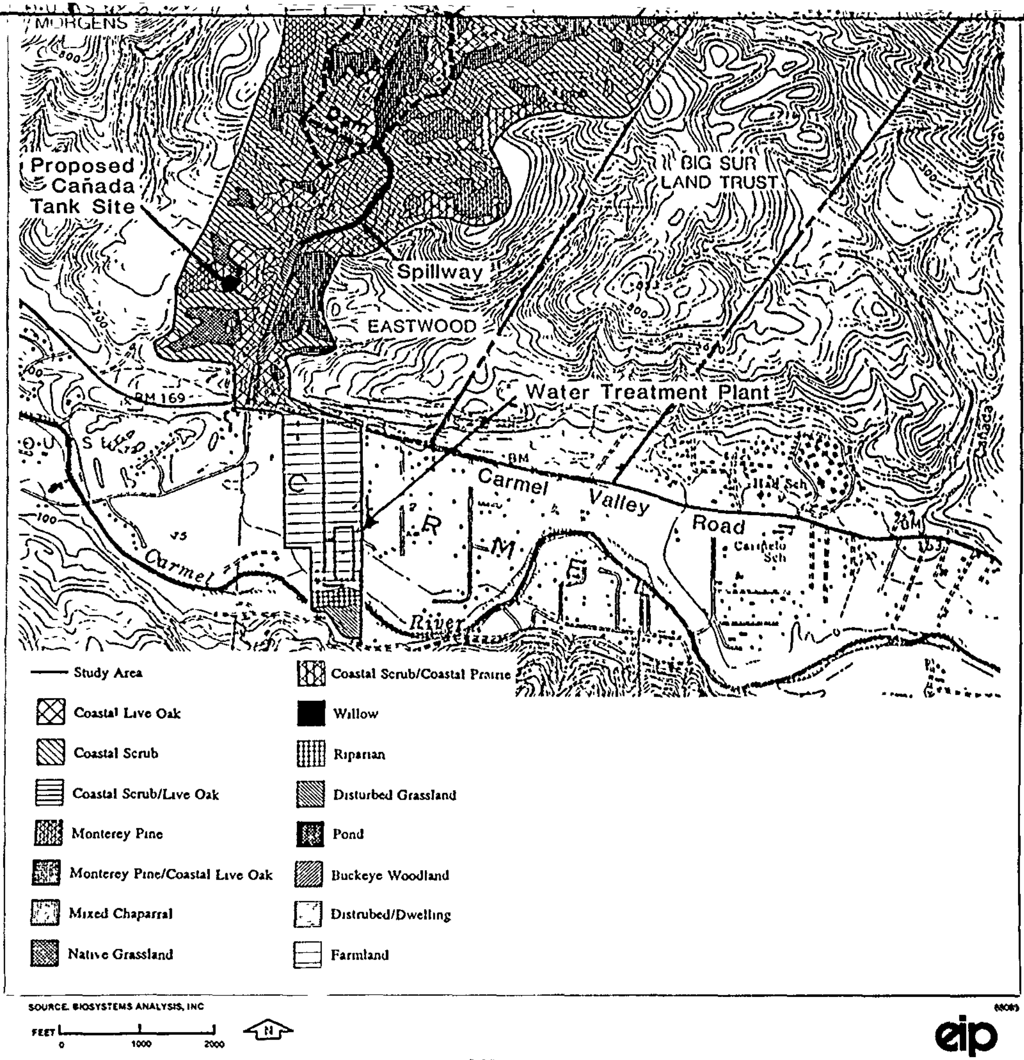
MORGENS
Proposed Cañada Tank Site
Spillway
EASTWOOD
BIG SUR LAND TRUST
Water Treatment Plant
Carmel Valley Road
Carmel River
BM 169
Study Area
Coastal Live Oak
Coastal Scrub
Coastal Scrub/Live Oak
Monterey Pine
Monterey Pine/Coastal Live Oak
Mixed Chaparral
Native Grassland
Coastal Scrub/Coastal Prairie
Willow
Riparian
Disturbed Grassland
Pond
Buckeye Woodland
Distrubed/Dwelling
Farmland
SOURCE: BIOSYSTEMS ANALYSIS, INC
FEET 0 1000 2000
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and coast live oak codominant. The associated tree, shrub, and herb species are those of the coast live oak forest. The most extensive stands of this habitat type are on slopes in the eastern portion of the project area, east of the drainage of the main north-south canyon (see Figure 9-7). Several smaller stands occur west of this drainage. It is unclear whether there is a successional trend in this habitat type, but it is likely that prolonged absence of fire would favor increasing dominance of coast live oak, while frequent fires would favor increased Monterey pine.Buckeye Woodland

Buckeye Woodland. This is a fairly dense woodland consisting almost totally of California buckeye in the canopy layer. Associated shrubs include poison oak, coyote brush, Mexican elderberry, and coffeeberry. Some of the native herbs associated with the coast live oak forest (above) are also present in this habitat type, although the diversity of native herbaceous species is far less. A large number of weedy non-native herbs, including bur-chervil (*Anthriscus caucalis*), poison hemlock (*Conium maculatum*), bull thistle (*Cirsium vulgare*), prickly lettuce (*Lactuca serriola*), milk thistle (*Silybum marianum*), wild radish (*Raphanus sativus*), common chickweed (*Stellaria media*), lamb's quarters (*Chenopodium album*), and horehound (*Marrubium vulgare*), are relatively abundant in this habitat type, suggesting that it has developed in areas of past disturbance. Two stands of this habitat type occur in the project area, both in the bottoms of large canyons (see Figure 9-7), one south of the proposed dam site and one eastern canyon north of the proposed dam site.

Coastal Scrub (Central [Lucian] coastal scrub). The coastal scrub of the project area is a mostly rather dense, low- to medium-height scrub dominated by a number of evergreen and deciduous shrubs, including poison oak, coyote brush (*Baccharis pilularis* ssp. *consanguinea*), coast sagebrush (*Artemisia californica*), common hazardia (*Hazardia squarrosa*), black sage (*Salvia mellifera*), coffeeberry, redberry, and sticky monkeyflower (*Mimulus aurantiacus*). Coastal scrub is widespread throughout the project area (see Figure 9-7), generally occurring on higher, more exposed slopes. In the eastern half of the project area, coastal scrub often occurs on upper slopes above forest stands on the lower slopes. Some large stands of coastal scrub, particularly on the west side of the main north-south canyon, extend all the way to the canyon bottom.

Coastal Scrub/Live Oak. This habitat type, which occurs on ridgetops and upper slopes in the east-central portion of the project area (see Figure 9-7), is transitional between coastal scrub and coast live oak forest. It is characterized by shrubs and herbs of the coastal shrub habitat type

interspersed with individual trees or small groves of coast live oak, associated with shrubs and herbs characteristics of the coast live oak forest. A successional trend from coastal shrub to coast live oak may be underway in this habitat type.

Chaparral (Transitional between northern mixed chaparral and central maritime chaparral). The chaparral of the project area is a dense, tall scrub dominated by chamise (*Adenostoma fasciculatuum*) and manzanita (*Arctostaphylos tomentosa* complex). Few other shrub or herb species are associated with this habitat type. The presence of manzanitas of the *Artostaphylos tomentosa* complex, as well as the proximity of the project area to the coast, are suggestive of the central maritime chaparral community, but the relatively high abundance of chamise and the absence of other endemic manzanita species, such as *Arctostaphylos hookeri*, *A. montereyensis*, or *A. pumila*, indicate an affinity with the much more widespread northern mixed chaparral community. There are two stands of chaparral in the project area (see Figure 9-7): a relatively large stand in the northwestern part of the area and a much smaller stand near the eastern boundary in the east-central part.

Coastal Prairie (Coastal terrace prairie). The coastal prairie is a grassland community largely dominated by native perennial grasses. In the coastal prairie of the project area, these include California oatgrass (*Danthonia californica*), meadow barley (*Hordeum brachyantherum*), June grass (*Koeleria cristata*), small-flowered needlegrass (*Stipa lepida*), purple needlegrass (*Stipa pulchra*), and tall trisetum (*Trisetum canescens*). Some non-native annual grasses, including slender wild oat (*Avena barbata*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus mollis*), and farmer's foxtail (*Hordeum leporinum*), are also present. A diverse assortment of native herbs is associated with the grasses Despite the abundance of some non-native species, the overall aspect of this habitat type is of a grassland dominated by native grass and herb species. Coastal prairie stands occur in two portions of the project area. south of the proposed dam site west of the main canyon, and near the north end of the study area. These coastal prairie stands occur on nearly level, dissected coastal terrace remnants and gentle upper slopes.

Coastal prairie is a sensitive habitat type because coastal prairie grasslands have declined greatly since European settlement in California due to a number of disturbance factors, including urbanization, conversion to intensive agriculture, overgrazing, the introduction of weedy non-native species, and the cessation of frequent fires.[9]

Coastal Prairie-Coastal Scrub. This habitat type, transitional between coastal prairie and coastal scrub, consists of native perennial and non-native annual grass species characteristic of the coastal prairie habitat, accompanied by mostly native herbs, overtopped by shrubs of the coastal scrub community at varying densities. The associated herb species are mostly species characteristic of the coastal prairie (above), but a few species, including poison sanicle (*Sanicula bipinnata*), fragrant everlasting (*Gnaphalium beneolens*), and Henderson's shooting star (*Dodecathon hendersonii*), seem to be largely confined to this habitat type within the project area. Stands of this habitat type occur scattered on ridgetops and upper slopes along the southern and eastern periphery of the main part of the project area (see Figure 9-7). The successional status of this habitat type is unclear, but it seems likely that there is a slow successional trend toward coastal scrub.

Riparian Forest (Central coast arroyo willow riparian forest). Riparian forest in the project area is mostly confined to a strip on both sides of the Carmel River in the vicinity of the proposed intake facility and pump station (see Figure 9-7). A brief description of this habitat type is presented below, and a more detailed description is presented in the Biological Assessment Report for the site. This is a sensitive habitat type because of its value to wildlife and because it has declined due to large-scale disturbances such as urbanization, stream channelization, and conversion for agriculture. In addition to the riparian forest along the Carmel River, two very small stands of this habitat type, consisting of mostly arroyo willow with few associates, occur at the bottom of the large southwest-draining canyon in the east-central portion of the project study area (see Figure 9-7).

Pond (Coastal and valley freshwater marsh). A small pond, probably artificially created, is located along the eastern boundary of the project study area near the north end (see Figure 9-7). The margins of this pond support an assemblage of species characteristic of freshwater marshes and other permanent or seasonally wet habitats. These include stipitate allocarya (*Plagiobothrys stipitatus* var. *micranthus*), vernal water-starwort (*Callitriche verna*), hyssop loosestrife (*Lythrum hyssopifolia*), umbrella-sedge (*Cyperus eragrostis*), creeping spike-rush (*Eleocharis palustris*), and tule (*Scirpus acutus*).

Disturbed Grassland. Disturbed grassland areas are open areas dominated by mostly weedy, non-native grasses and herbs. Only a few native herb species are associated with this habitat type; many

of these are species of ruderal tendencies. Disturbed grassland occurs in several locations on the floor and lower slopes of the main north-south canyon (see Figure 9-7), in areas heavily disturbed by past overgrazing or by grading, brush clearing, and similar activities.

Farmland. The portion of the project area between the Carmel River and Carmel Valley Road, through which the proposed transmission pipeline would run, is occupied by agricultural fields. The margins of these fields, including a narrow strip between the agricultural fields and the Carmel River riparian forest, support an assemblage of weedy, mostly non-native species similar to those found in the disturbed grassland.

Old Dwelling Sites. An old dwelling site occurs within the project study area. It is characterized by exotic trees and shrubs such as redwood (*Sequoia sempervirens*, almost certainly planted), green wattle (*Acacia decurrens*), French broom (*Cytisus monspessulianus*), and blue gum (*Eucalyptus globulus*), along with weedy, mostly non-native herbaceous species.

Carmel River Valley Riparian

There have been a number of reported surveys and studies on the vegetation associated with the Carmel River Valley flood plain.[9] The vegetation is classified as riparian, a vegetation community associated with water courses. The riparian vegetation of th: Carmel River is typical of waterways in the Central Coastal region of California and shares the following features:

- o dependency on a relatively constant supply of water from surface or groundwater;
- o conspicuous zonation parallel to the waterways on gravel bars, and low and high terraces;
- o marked contrast and abrupt transitions from riparian to adjacent terrestrial communities, and
- o extensive ecotonal edge (i.e., transition between ecosystems) due to the linear distribution of riparian communities along river channels, and the interwoven mosaic of various riparian community types.

Although a dam and reservoir is not proposed in this section of the Carmel River, various alternative dam sites upstream may have an effect upon the riparian communities along these

downstream sections of the River. The alternatives are expected to change the flows downriver of the dam, which would have an effect upon the development of the riparian vegetation in the river flood plain, and at the mouth of the river.

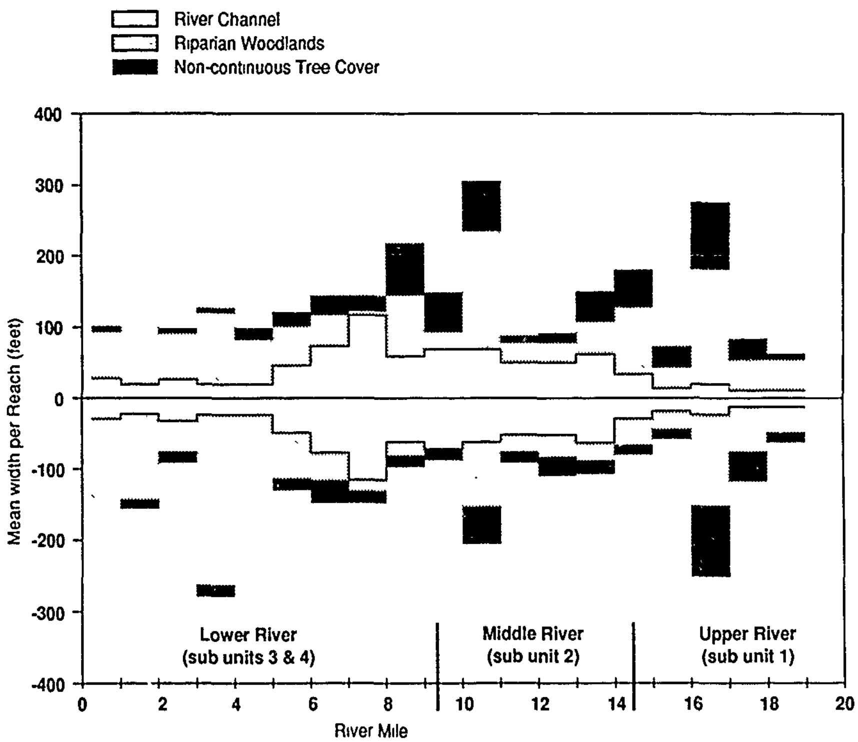
The riparian vegetation along the Carmel River used to be more extensive than it is today. Prior to the construction of the San Clemente Dam in 1921, major flood events changed the course of the Carmel River throughout the valley bottom. The construction of the dam has resulted in the establishment of a narrower, more sinuous stream channel with higher floodplain terraces. Prior to 1960, the Carmel River supported a continuous cover of riparian forest.[10] Since 1960, the riparian forest has been reduced to a discontinuous, narrow strip (seldom no more than two tree crown diameters wide) lining the riverbank. This loss of riparian vegetation can generally be attributed to a combination of human activities, including urban development and agricultural practices, and lowering of the water table due to groundwater pumping. These land use practices, in combination with other natural causes, such as droughts, have created a mosaic of plant associations and habitat types. Eight riparian habitat types were described for an avian survey conducted in 1987 for this report (see Appendix 9-C) and are briefly summarized below. A schematic representation of the Carmel River riparian corridor is presented in Figure 9-8.

The lower portion of the river (Subunit 4, River Mile 1 to 5) supports a well-developed riparian forest (see Figure 9-1). This forest is dominated by large deciduous trees (30-60 feet tall) with overlapping canopies. The dominant tree species is the black cottonwood, with sycamores and willows dominating smaller areas. The understory varies from bare ground or low herbaceous cover (due to recent scouring) to a dense scrub thicket of white alders immediately along the banks or common brush species such as poison oak, wild rose and blackberry (15-35 feet tall).

Riparian woodland or thickets are the most common and extensive habitat type along the river (Subunits 3 and 2, see Figure 9-1). A woodland is also dominated by large trees, however, unlike the forest type, the canopies do not overlap, and there is a wide range of tree densities. The most common tree species are identical to the forest type. A thicket is very similar to the woodland type except that these are typically dense stands of one or two tree species less than 20 feet in height. Common and dominant species of the thicket type are red willow (*Salix laevigata*), sandbar willow (*Salix hindsiana*), cottonwood, and alder. There is a continuum of size and structural complexity between the woodland and thicket types.

SCHEMATIC OF CARMEL RIVER
RIPARIAN CORRIDOR (1986)

FIGURE 9-8



SOURCE MCNIESH, 1991

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Riparian scrub is a second common habitat type throughout the middle and lower river (Subunits 2 and 3, see Figure 9-1). However, it is most often very limited in extent in any given area. This habitat type is most common on gravel bars. It lacks a well-established tree canopy and is dominated by low shrubs, two of which are 10 feet in height. Common and characteristic plant species in this habitat type include mugwort (*Artemisia douglasiana*), coyote bush (*Baccharis pilularis*), blackberry, mule fat (*Baccharis viminea*), and sweet fennel (*Foeniculum vulgare*). The most extensive stands of this habitat type occur in the middle river section (Subunit 2) above Garland Park.

The remaining habitat types are scattered throughout the river valley to a much smaller degree. Dry washes and barren gravel bars represent areas that have recently been scoured by the river, and all that has developed is low herbaceous growth. There are numerous examples of this habitat type in the river bed areas. Emergent vegetation occurs in and along the shallow borders of deep pools with permanent surface water. Typical plant species include sedges (*Carex* spp.), rushes (*Juncus* spp.), bulrush, and cat-tail (*Typha* spp.). At those points where the river bed is closest to the valley walls, the mixed evergreen forest-riparian type, similar to the upper river area, occurs. Remnants of this type also occur on the upper alluvial terraces. Along some small stretches of the river corridor, the native vegetation has been removed and replaced with ruderal (weedy) or nonnative vegetation. Eucalyptus groves, grass-covered banks and new rip-rap areas are examples of this habitat type.

As noted above, the riparian vegetation on the Carmel River has been suffering from a combination of factors and events, of which the most studied and analyzed are the effects of groundwater pumping. Throughout the lower and middle sections of the Carmel River, where stream flow is intermittent, the riparian vegetation must rely on groundwater for growth and survival during the dry season. The degree to which groundwater pumping depresses the water table (resulting in stresses upon the vegetation dependent upon this water) is influenced by several interrelated biological and physical site factors. However, a recent study concluded that groundwater pumping in portions of the Carmel Valley has severely stressed riparian vegetation and contributed to the loss of this community in portions of the middle and lower sections.[11]

The middle section of the Carmel River runs from near Hitchcock Canyon to the Narrows (see Figure 9-1). A simulated plant stress model indicated that current levels of groundwater pumping

during extremely dry years (such as 1989 and 1990) would result in severe physiological stress on 3.5 acres of riparian vegetation immediately upstream of the Narrows. Pumping would also place significant stress upon the riparian trees near the Los Laureles Wells.[12] In fact, in 1989 and 1990, relatively minor pumping from the Los Laureles Wells resulted in severe stress and death of willows and alders located in the channel bottom between and upstream of these wells.

The upper portion of the lower section (Subunit 3, see Figure 9-1) is the rea of the Carmel River with the most groundwater pumping (resulting in greater than 80 percent of the total aquifer production in normal years), and an extensive section of riparian woodlands have been lost in that area as well. In response to the stress on the existing riparian vegetation, MPWMD has initiated irrigation from the Scarlet Wells to the San Carlos Wells to sustain the riparian corridors in the vicinity of these wells. Studies have indicated that available soil water near the Berwick, Begonia, and San Carlos Wells was typically exhausted to a depth of ten feet before the end of August, and that pumping from the most recent wells in the Carmel Valley did result in signs of stress on the nearby riparian vegetation.[13]

Under current groundwater pumping levels, it is estimated that approximately 59 percent of the existing riparian vegetation in this reach of the Carmel River would suffer severe stress due to lack of water in normal water years. Nearly all vegetation would suffer in critically dry years.[14] The expected loss of riparian vegetation would be greater at the San Carlos well site, where the existing riparian vegetation is most extensive relative to other areas in this reach of the river. The existing riparian vegetation is described as "limited, discontinuous, and degraded" in the areas of the older wells.[15] The loss of riparian species often results in the invasion of more drought-tolerant and non-riparian plant species. This has occurred to some extent at the Cypress and Pearce Wells where pines and cypress line the upper banks.

The lower portion of the Carmel River (Subunit 4, see Figure 9-1) has one Cal-Am production well near Rancho Cañada. According to the plant stress model, the greatest stress would occur in the reach between the Rancho Cañada and San Carlos Wells. Pumping would affect 22 percent of the riparian vegetation in normal years, and 27 to 32 percent in critically dry years of varying severity.

It is evident from the discussion that the existing riparian vegetation in the Carmel River Valley is but a remnant of what used to be there as recently as 1950, and that the threat of greater losses due to groundwater pumping occurs in the lower sections from the Narrows to the lagoon.

Carmel River Lagoon

There is a brackish water marshland at the river mouth. This marshland is within the Carmel River State Beach and is proposed to be designated as a natural preserve. The marsh vegetation is composed of five distinct zones: California tule (*Scirpus californicus*), pickleweed mosaic, silverweed-rush (*Potentilla-Juncus*), highground transition, and riparian.[16]

The California tule zone is composed of virtually pure stands of this brackish water plant rooted in the seasonally inundated muds along the banks of the river channel and sloughs. This vegetation zone is a key element of the marsh community because of the large area it covers and its value as a food and cover plant for wildlife.

The pickleweed mosaic is a complex of saltwater marsh species that dominate the low-lying areas between the California tule and the somewhat higher silverweed-rush community. This community is believed to be a product of alkaline buildup in the soils due to less freshwater flushing. The habitats nearer the river channel are flushed more often with fresh water flows in the river, thereby diluting the alkalinity of these habitats. The dominant plant species typically associated with saltmarsh communities and found in the marsh were jaumea (*Jaumea carnosa*), saltgrass (*Distichlis spicata* var. *spicata*), pickleweed (*Salicornia virginica*), and fat hen (*Atriplex patula*).

The silverweed-rush zone occurs in the higher reaches of the marsh. The silverweed (*Potentilla egedii* var. *grandis*) carpets large areas of the marsh. Wire grass (*Juncus balticus*) and spike rush (*Eleochris macrostachya*) also dominate areas in the marsh.

The upland habitats within the marsh are limited in extent and are dominated by blackberry thickets, coyote brush (*Baccharis* sp.), and ice plant (*Carpobrotus* sp.). These upland areas may be areas where fill was placed at some point in the past At the east end where the river channel enters the marsh, the channel is lined with willow and acacia shrubs.

The lagoon habitat has been degraded over the past decades as described in Chapter 7, Section 7.1.1.

9.1.2 WILDLIFE

Wildlife resources on the proposed alternative sites for the proposed projects were assessed during field surveys conducted by wildlife biologists in May, June, July, and August 1989, and in May 1990. During these efforts, each alternate site was examined on foot and vehicle to determine the types quality and extent of suitable wildlife habitats and to identify as many wildlife species as possible. A literature search was used to generate a list of all wildlife species that could reasonably be expected to occur on the sites.[17] This list, all species positively identified during the field surveys, and the scientific names of all animals referred to in this section are presented as Appendix 9-B.

New Los Padres Reservoir Site

Wildlife resources on this site were surveyed on May 27-28, 1989. All of the potential inundation area was examined on foot. In addition to field observations, a small number (20) of Sherman-type live traps were set in woodland and grassland habitats near the Carmel River below the existing Los Padres Dam to obtain information on small mammal species present in the area. These combined efforts identified 11 mammal, four reptile, two amphibian, and 35 bird species during the survey (Appendix 9-B, Site A). The wildlife component of this area occurs throughout most of the Carmel Valley drainage system.[18]

With the exception of the riparian habitats available along the Carmel River above and below the Los Padres Reservoir, wildlife habitats in this narrow, steep canyon occur in mosaic patterns of various vegetation types dependant on slope, soil type and physical aspect for their definition. Oak woodland occupies canyon bottoms and northwest-facing slopes. Coastal chaparral occurs on southwest slopes and some small areas of grassland occur. This intermixing of habitat types provides a great deal of "edge effect" and permits a rich assemblage of wildlife to occupy the area. The permanent water supply of the reservoir and its tributary streams further enhances wildlife values.

Because of its increasing rarity in California and its high wildlife value, the most important habitat in the area is the riparian habitat along the Carmel River. The willow/alder-dominated sand bar riparian area above the reservoir shows the successional changes associated with natural scouring and channel movements that occur each year. Young trees on shifting gravel bars and the vegetation that grows on newly deposited silt and sand provide rich food sources for a wide variety of animals dependent upon moist, micro-habitats. Indicative of the quality of riparian habitats above the reservoir was the presence of the yellow warbler, song sparrow, and foothill yellow-legged frog, all species generally found in good-quality riparian corridors.

In contrast, the more picturesque riparian corridor below the dam is dominated by mature alder, willow, bay and sycamore trees and shows little recent successional change. There is very little emergent vegetation in or near the shaded stream bed in this reach. No reptiles or amphibians were observed in this reach of the Carmel River below the dam, and few birds, except the Black Phoebe, associated primarily with riparian habitats were seen.

New San Clemente Reservoir Site

The potential inundation area of the proposed new San Clemente Reservoir above and below the existing San Clemente Dam was surveyed on foot on July 1 and 2, 1989. Nine mammal, six reptile, two amphibian and 42 bird species were identified during this effort (Appendix 9-B, Site E).

Above the existing reservoir, the Carmel River passes through a narrow canyon and is lined by a corridor of dense riparian vegetation. While providing excellent wildlife habitat, this portion of the river lacks many of the healthy signs of change and successional vegetation growth present along the same river course above the Los Padres Reservoir. Since the flow of water along this reach of the river is regulated by the Los Padres Dam the vegetation tends to be more mature, the river banks more heavily vegetated and the aquatic habitats more silted than the upstream portion of the river.

Despite the effects of its regulated water flow, this reach of the Carmel River above the San Clemente Reservoir and the rich mixture of coastal scrub and mixed evergreen woodlands that cover the walls of the surrounding steep canyon provide a very diverse assemblage of wildlife

habitats. The availability of a perennial water source further enhances the wildlife values of this area.

The potential inundation area below the existing San Clemente Dam contains mature riparian habitats similar to those encountered above the reservoir and below Los Padres Dam. Deep pools below the main dam formed by a series of man-made check dams and natural barriers have slowed the movement of water to permit the maturation of dense riparian vegetation that lines the river course.

This stretch of the river contains a dense population of very large bullfrogs that appear to be thriving in the large pools. The presence of this introduced species of amphibian in such large numbers probably accounts for the limited sightings of native species, such as the red-legged frog, which has been reported as far downstream as the Boronda Road bridge (River Mile 12.7).

The coastal scrub and mixed evergreen vegetation that covers the very steep canyon walls below the dam provide good wildlife habitat values. Developments below the dam for access roads, pipelines and equipment storage areas have removed some wildlife habitat, but the prohibition of human access to the area and resultant lack of disturbance permit the continued existence of an excellent assemblage of wildlife in this area.

Cachagua Creek Reservoir Site

Wildlife resources on this site were surveyed on August 7, 1989. The inundation area from the proposed dam site on Cachagua Creek to the intersection of Cachagua Road with Tassajara Road was examined on foot. Due to restricted access, properties along the eastern side of the Tassajara Road were examined only from the roadway. However, the valley at this point is very narrow and steep, and habitats were so similar to those along Cachagua Road that careful study of this area with binoculars was considered adequate. Additional information on wildlife was obtained from interviews with local residents.[19] These combined efforts identified 14 mammal, six reptile and 19 bird species in the area (Appendix 9-B, Site B).

Dense coastal chaparral covers most southwestern hill exposures, and oak woodland covers the remaining hilly areas and gullies. Grassland was limited to small areas on the valley floor and open patches between oaks.

Cachagua Creek was dry at the time of the survey, although damp areas under rocks and in deeper holes along the creek indicated that water had recently been present. Water was still moving underground at depths of 4 to 5 inches. The boulder-strewn creek bed was shaded by a well-developed corridor of riparian vegetation. The large number of California Quail in the area, a species which requires water each day, indicated that nearby surface water sources were available.

Wildlife usage was limited to some extent by the lack of water in Cachagua Creek. Cattle grazing and residential developments have reduced the habitats available for wildlife in this narrow, arid valley.

San Clemente Creek Reservoir Site

The potential inundation area along the lower reach of San Clemente Creek just above San Clemente Reservoir was examined on foot on July 2, and the upper reach through the Dormody Ranch was examined on August 6, 1989. These surveys and interviews with local residents established the presence of at least 14 mammal, 10 reptile, six amphibian, and 27 bird species in the area (Appendix 9-B, Site C).[20]

San Clemente Creek downstream from the man-made pond on the Dormody Ranch to San Clemente Reservoir provides relatively undisturbed habitats with high wildlife values. The riparian corridor is particularly valuable as wildlife habitat. The boulder-strewn stream bed with its perennial water flow shows how scouring from heavy winter runoff maintains a healthy mixture of mature and successional vegetation. Openings in the tree canopy permit light to reach the creek stimulating the growth of a luxuriant understory in some areas.

The high quality of this aquatic habitat is evidenced by the presence of a healthy population of the red-legged frog along the lower reach of the creek. This increasingly rare species of native California frog is particularly sensitive to habitat degradations and disturbance. For example, it is

easily displaced by introduced species of frogs, such as the Bullfrog, which usually causes wildlife habitat values to decline.

Upstream from the impoundment on the Dormody Ranch, San Clemente Creek passes through an area of weekend and residential cabins and a vacation resort development. Habitats on this reach, though retaining good wildlife values, have been disturbed and the creek altered or channelized for development. The healthy population of bullfrogs that populates the impoundment and the upper reach of the creek poses a serious threat to the population of red-legged frogs below the impoundment.

Small groves of Redwood trees occur along the creek, and dense, mixed, evergreen woodland covers most of the floor of this narrow canyon. Steep slopes of the canyon are vegetated by shrubby species that make up coastal scrub habitat. San Clemente Canyon's mixture of habitat types and perennial water flow make it a valuable wildlife area.

Chupines Creek Reservoir Site

The three areas of the broad shallow valley through which Chupines Creek and its tributaries flow were examined on foot to assess their wildlife and habitat values on June 23, 1989. This survey, in conjunction with interviews with landowners and other biologists, was used to compile a list of 12 mammal, seven reptile, one amphibian and 49 bird species known to use the valley (Appendix 9-B, Site D).[21,22]

The floor of the valley has been cleared and farmed for hay, grain crops and pasturage for many years. The narrow corridor of riparian vegetation that remains along Chupines Creek and its tributaries has been heavily damaged by livestock except in some small reaches where fencing has restricted their access. In protected portions of the creekbed, dense riparian woodland and open water provide excellent, though limited, areas of wildlife habitat. Riparian vegetation along the creeks occurs in small isolated segments separated by open areas, which minimizes its overall value as a corridor for wildlife movement and shelter.

Hillsides above the creeks are vegetated with a mixture of coastal scrub and typical California evergreen woodland species. Heavy grazing of these habitats has reduced their understory species and thus their wildlife habitat values.

At the time of the survey, the valley was very hot and dry, and its limited wildlife habitats showed signs of the stresses associated with several prior years of drought. In addition to the limitations on wildlife posed by agricultural disturbances and drought, there was clear evidence of the presence of a mountain lion residing in the valley. Residents reported that several lions had moved into the area several months earlier and had either driven away or preyed upon many commonly expected mammals. No sign of coyotes, raccoons, or opossum were found, and only a single grey fox was found living near a ranch house. Ranchers also said that feral cats and a pack of feral dogs, which had caused a great deal of damage on local sheep flocks, disappeared from the valley shortly after the lions arrived.

Cañada Reservoir Site

The information presented below represents a summary of the findings of a report prepared on this site by a separate consultant.[23] Field surveys were conducted in the reservoir inundation area, along the pipeline route, and at the pumping station site on May 14, 17, 18 and 29, 1990. Twenty-one mammal, seven reptile, one amphibian, and 75 bird species were identified during the field survey efforts (Appendix 9-B).

The wildlife habitat classification system used for this site was developed for the California Wildlife Habitat Relationships Program.[24] Correspondence between the vegetation classification and wildlife habitats is shown in Table 9-1. Table 9-2 shows the extent of each wildlife habitat type in the Cañada Reservoir Project study area and inundation zone. Much of the wildlife habitat in and surrounding the inundation area is severely degraded by sheep grazing.

Closed-Cone Pine-Cypress (CPC). Monterey pine is the dominant overstory species in the closed-cone pine cypress habitat in the study area. The structure of this type varies from an all but fairly simple two layer structure to a complex multilayer composition in the west and northwest portions of the project area. In addition to the diverse vegetation, these areas also contain many standing

TABLE 9-1

CORRESPONDENCE BETWEEN VEGETATION CLASSIFICATION AND WILDLIFE HABITAT CLASSIFICATION[1,2]

Vegetation Type	Wildlife Habitat
Monterey pine forest	Closed-cone pine-cypress (CPC)
Monterey pine-coast live oak forest	Closed-cone pine-cypress (CPC)
Coast live oak forest	Coastal oak woodland (COW)
Buckeye woodland[3]	Coastal oak woodland (COW)
Coastal scrub	Coastal scrub (CSC)
Coastal scrub-live oak	Coastal scrub (CSC)
Chaparral	Mixed chaparral (MCH)
Coastal prairie	Perennial grassland (PGS)
Coastal prairie-coastal scrub	Perennial grassland (PGS)
Riparian forest	Valley foothill riparian (VRI)
Pond	Freshwater emergent wetland (FEW)
Disturbed grassland	Annual grassland (AGS)
Old dwelling sites	Annual grassland (AGS)
Farmland	Cropland (CRP)

[1] Holland, 1986.
[2] Mayer and Laudenslayer, 1988.
[3] Not recognized in Holland, 1986.

Source: BioSystems Analysis, Inc., 1991.

TABLE 9-2

EXTENT OF WILDLIFE HABITATS
IN THE CAÑADA RESERVOIR STUDY AREA

Wildlife Habitat	Area of Habitat (Acres) Study Area	Inundation Area
Closed-cone pine-cypress (CPC)	477.6	67.6
Coastal oak woodland (COW)	160.5	55.5
Coastal scrub (CSC)	415.6	106.2
Mixed chaparral (MCH)	11.2	0.0
Valley foothill riparian (VRI)	4.4	0.8
Perennial grassland (PGS)	56.6	0.0
Annual grassland (AGS)	18.0	9.0
Freshwater emergent wetland (FEW)	<0.1	0.0
Cropland (CRP)	45.2	0.0
TOTAL	1,189.2	239.1

Source: BioSystems Analysis, Inc., 1991.

dead trees (snags) and large organic material (logs), which are very important to maintaining a diversity of wildlife species. The broad ecotones created at the interface of closed-cone pine-cypress, coastal oak woodland, and coastal scrub appear to have a particularly diverse species composition and abundance. In contrast with other habitats in this region, Monterey pine provides tall and presumably secure locations for large nesting birds.

Coastal Oak Woodland (COW). Coastal oak woodland is widespread in the project area. Structure of this habitat varies from widely scattered trees with an open canopy to thick herbaceous ground cover and rich woody shrub midstory. Intensive livestock management practices have noticeably altered the understory vegetation by removing biomass, changing growth form, simplifying plant species composition, and suppressing reproduction. This symptom is most evident on the Eastwood property. The larger canyons support a greater diversity of tree species. To many species of wildlife, these sites are functionally similar to riparian habitat and should be considered sensitive.

Coastal Scrub (CSC). Coastal scrub is the second most abundant habitat in the project area and the dominant type within the inundation zone. To a large extent, this habitat consists of low- to moderately-sized shrubs with dense canopy cover and dense understory cover of annual grasses and forbs. Although this habitat appears to be structurally homogeneous, there seems to be a great deal of variation among stands.

Mixed Chaparral (MCH). Several small areas of mixed chaparral occur along the ridge on the western boundary of the project area. While no wildlife species are restricted to mixed chaparral habitat, it does provide many important wildlife forage plants such as *Ceanothus* spp., *Adenostoma fasciculatum*, and *Arctostaphylos* spp.

Valley Foothill Riparian (VRI). The only riparian habitat found within the inundation area are two narrow stringers of willows, each about 200 feet long. The willow stands are located near an old sediment basin, the northeast arm of the reservoir (Figure 9-7). Both sites are fairly homogeneous, but they add considerable spatial diversity to the surrounding areas Only two small sites of open water were found near the stand of willows. These water holes appeared to have been dug with a backhoe, however, recognizing that there has been a drought for the past several

years, we would expect to find more water in years with "normal" rainfall. Well-developed valley foothill riparian habitat is restricted to the area adjacent to the Carmel River.

Perennial Grassland (PGS). Perennial grassland primarily occurs along the ridgetops in the northern portion of the project area. Vertical structure of this habitat is typically low. However, horizontal diversity appears quite high, perhaps caused by local differences in soils. Perennial grasslands provide suitable habitat for many wildlife species.

Annual Grassland (AGS). Annual grassland habitat is scattered throughout the project area. Many of these areas have resulted from some form of disturbance (clearing brush and trees, livestock grazing, etc.). Physical structure of this habitat is dominated by low-growing forbs and grasses.

Freshwater Emergent Wetland (FEW). Freshwater emergent wetland is represented by one small catchment pond outside of the inundation zone, along the north-central portion of the project area boundary. This and several other similar areas located in the perennial grasslands appear to be man-made livestock impoundments. These sites provide wildlife with important food, cover and water resources. Although small, they greatly increase the value and influence wildlife species composition in surrounding habitats.

Cropland (CRP). Cropland habitat occurs south of Carmel Valley Road to the Carmel River. Vegetation structure of this area is simple but changes with the growing season. This location is regularly disturbed by human activities. Cultivated and ruderal plants periodically provide important food resources for many wildlife species.

General Wildlife Species

Black-tailed deer and California quail appeared to be very abundant in the study area. During late summer it was not unusual to note several coveys of 100+ quail and a few dozen deer within an hour's field observation. Dozens of striped skunk, several coyote, raccoons, opossums, domestic dogs and cats, two gray foxes, and one bobcat were sighted during spotlighting. The most abundant mammal observed in grassland habitats was the California ground squirrel. In the coastal live oak forest the dusky footed woodrat appeared to be very numerous. Feral pigs were observed several times, but were restricted to the vicinity of the open water where they had established a mud

wallow. The presence of mountain lions was noted on three occasions. One solitary cat was flushed from the understory in Monterey pine habitat, the skeleton of a male mountain lion was found near the pig wallow; and a freshly killed, partially eaten deer fawn was located at the pond (freshwater emergent wetland) on the boundary of the property.

9.1.3 SPECIAL STATUS SPECIES

Pursuant to Section 7 (Consultation Procedures) of the Federal Endangered Species Act, the following actions were completed. The MPWMD requested from the USFWS a list of endangered species that could potentially be affected by the proposed New San Clemente Dam project in 1986 and all the remaining project alternatives except Cañada Reservoir in 1989. An updated list was provided on June 12, 1991. The USFWS identified five endangered, threatened or candidate plant and animal species in response to the 1986 request, 10 additional species in the 1989 response that are known to occur or might occur in the project area and four additional candidate species (Category C2 and C3) in the 1991 response (see Appendix 9-D). In addition to these lists provided by the USFWS, the California Department of Fish and Game provided the MPWMD with a letter in 1983 with additional species of concern (see Appendix 9-D) Prior to conducting the actual field surveys, a number of literature sources were used to generate a working list of sensitive plant and animal species with potential to occur in the project region. The list of sensitive wildlife and plant species generated from these literature sources are presented in Tables 9-3 and 9-4.

All wildlife and plant field surveys were directed toward identifying the presence of any of these special-status species or any other sensitive species. Species-specific surveys at selected sites and habitats were conducted for those species considered to have the greatest potential of occurring at any of the sites A series of meetings and written communications with the USFWS established suitable survey methods and scope of efforts for the least Bell's vireo on the Carmel River, the Smith's blue butterfly at all of the alternative reservoir sites, and for the spotted owl at the Cañada Reservoir site. The results of the specific surveys for these endangered wildlife species are presented in Appendix 9-C. This EIR/EIS and the reports in Appendix 9-C are intended to function as the Biological Assessment for these species and have been submitted to the Endangered Species Office of the USFWS in compliance with Section 7 of the Endangered Species Act. The following is a brief discussion of each sensitive plant or animal species either found at any of the

TABLE 9-3

ENDANGERED, THREATENED, OR CANDIDATE WILDLIFE SPECIES KNOWN TO OCCUR IN THE PROJECT REGION[1]

Taxa	Status[2]	Notes
MAMMALS		
Pacific western big-eared bat (*Plecotus townsendii townsendii*)	SSC3/C2/	A bat of coastal conifer and broad-leaf forests and wood lands mostly in mesic (damp) sites. Known roosting sites include limestone caves, lava tubes, mine tunnels, buildings and other man-made structures. Highly susceptible to human disturbance at roosting sites. No recorded sightings in project area.
Greater western mastiff bat (*Eumops perotis californicus*)	SSC3/C2/	A species of coastal basins of southern California favoring rugged, rocky areas where suitable crevices are available for day-roosts. A large bat which may forage over a wide range from its temporary roosts. Recorded in Monterey County at Camphora, 2 mi. N. of Soledad. No recorded sightings in the project area.
Pallid bat (*Antrozous pallidus*)	SSC3/ /	This is a locally common bat of low elevations throughout California. It occupies a wide variety of habitats, but roosts in swamp caves, hollow trees and abandoned buildings No reported sightings in the project area.
American badger (*Taxidea taxus*)	SSC3/ /	This is an uncommon permanent resident found throughout the State except in the north coastal region. It typically occupies a wide variety of habitats but needs friable soils for burrowing No sign of this animal was observed at any of the alternative sites.
BIRDS		
Golden eagle (*Aquila chrysaetos*)	SSC3/ /CFP	(See text).
American peregrine falcon (*Falco peregrinus anatum*)	CCE/E/CFP	(See text.)

Table 9-3 (Continued)

Taxa	Status[2]	Notes
Bald eagle (*Haliaeetus leucocephalus*)	CCE/E/CFP	Uncommon winter migrants. Requires large bodies of water or free-flowing rivers containing fish, with adjacent snags or other perches. Feeding strongly dependent on water-related prey such as fish and waterfowl. Nests in old growth or dominant live trees with open branch work, especially ponderosa pines. No recorded sightings in project areas.
Northern harrier (*Circus cyaneus*)	SSC2/ /	(See text.)
Black-shouldered kite (*Elanus caerulea*)	/ /CFP	(See text.)
Sharp-shinned hawk (*Accipiter striatus*)	SSC3/ /	(See text.)
Cooper's hawk (*Accipiter cooperi*)	SSC3/ /	(See text.)
Burrowing owl (*Athene cunicularia*)	SSC2/ /	Typically found nesting in burrows in open, flat grasslands. Suitable habitat for this owl is very limited at the sites and was not found during any of the survey efforts.
Short-eared owl (*Asio flammeus*)	SSC2/ /	Typically occurs in marshlands and open grasslands. Suitable habitat for this owl is very limited at the sites and it was not observed during the field surveys.
Spotted owl (*Strix occidentalis*)	SSC2/T	(See text.)
Least Bell's vireo (*Vireo bellii pusillus*)	CCE/E/	(See text.)
Tricolored blackbird (*Agelaius tricolor*)	/C2/	Same as short-eared owl above.
Yellow warbler (*Dendroica petechia*)	SSC/ /	(See text.)

Table 9-3 (Continued)

Taxa	Status[2]	Notes
AMPHIBIANS		
California tiger salamander (*Ambystoma tigrinum californiense*)	SSC2/C2/	Occurs in annual grassland and grassy understory of valley-foothill hardwood habitats. Specimens collected at Rancho Tularcitos January 27, 1958, and October 7, 1963. Also known from Tularcitos Ridge along Cachagua Grade Road approximately 7 mi. SE of Robles Del Rio, January 11, 1953.
Red-legged frog (*Rana aurora draytoni*)	SSC2/C2/	(See text.)
Foothill yellow-legged frog (*Rana boylei*)	SSC2/ /	(See text.)
REPTILES		
Southwestern pond turtle (*Clemmys marmorata pallida*)	SSC/C2/	(See text.)
Black legless lizard (*Anniella pulchra nigra*)	E/E/	(See text.)
Coast horned lizard (*Phrynosoma coronatum frontale*)	SSC/ /	(See text.)
INSECTS		
Smith's blue butterfly (*Euphilotes enoptes smithii*)	/E/	(See text.)

[1]Sources:

Arnold, R. A., Survey and status of six endangered butterflies in California. California Department of Fish and Game, Inland Fisheries Branch report. 95 pp., 1978.

California Natural Diversity Data Base (CNDDB). Computer printout for four surrounding 7.5 minute quadrangle USGS maps in the project region (Chualar, Spreckels, Seaside, Rana Creek, Carmel Valley, Mt. Carmel, Chews Ridge, Ventana Cones, Big Sur) June 10, 1989.

California Department of Fish and Game, Bird Species of Special Concern in California, No. 78-1 (June 1978).

Table 9-3 (Continued)

______________, Mammalian Species of Special Concern in California, Report 86-1 (June 1986).

______________, Special Animals List. December 1988.

BioSystems Analysis, Inc. Cañada Reservoir Project Biological Assessment, February 1991.

[2]State/Federal/Other:

State:

California Endangered Species Act (1984), Native Plant Protection Act (1977), and the California Environmental Quality Act.

R = Rare. Plants that although not currently Threatened are in such small numbers or restricted habitats that they may become Threatened or Endangered if present conditions continue.

T = Threatened. Plants or animals likely to become Endangered in the foreseeable future in the absence of protection action(s).

E = Endangered. Seriously in danger of becoming extinct.

CCE = California Candidate for listing as Endangered.

CCT = California Candidate for listing as Threatened.

SSC1 = Species of Special Concern (highest priority). These species face immediate extirpation of their entire California population or their California breeding population if current trends continue.

SSC2 = Species of Special Concern (second priority). These species are on the decline in a large portion of their range in California, but their populations are still sufficiently substantial that danger is not immediate.

SSC3 = Species of Special Concern (third priority). These species are not in any present danger of extirpation and their populations within most of their range do not appear to be declining seriously, however, simply by virtue of their small populations in California, they are vulnerable to extirpation should a threat materialize.

SSC = Species of Special Concern. No priority given.

Federal:

Federal Endangered Species Act of 1973, as amended
E = Taxa formally listed as Endangered.
T = Taxa formally listed as Threatened
C1 = Candidate taxa for which there is enough information to support the biological appropriateness of proposing to list as Threatened or Endangered.
C2 = Candidate taxa for which there is biological information that indicates that proposing to list the taxa as Threatened or Endangered is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate listing.
C3 = Taxa that are no longer under consideration for listing. There are three subcategories, depending on reason(s) for removal from consideration:

Other:

CFP = A California Department of Fish and Game "fully protected" species, as described in Section 4700 of Chapter 8, Section 5050 of Chapter 2, Division 6, Chapter 1, Section 5515.

TABLE 9-4

ENDANGERED, THREATENED, OR CANDIDATE PLANT SPECIES KNOWN TO OCCUR IN THE PROJECT REGION[1]

Allium hickmanii [Amaryllidaceae]
Common Name: Hickman's Onion
Status: C1//List 1B Habit: perennial
Habitat: Closed-Cone Forest, Chaparral, Valley Grassland
Counties: MNT, SLO
Bloom Time: 4
Notes: Known from fewer than 20 occurrences. Not found on any of the alternative sites.

Arctostaphylos hookeri ssp. *hookeri* [Ericaceae]
Common Name: Hooker's Manzanita
Status: //List 3 Habit: shrub
Habitat: Closed-Cone Forest, Chaparral & Coastal Scrub (sand dunes & woods)
Counties: MNT, SCR
Bloom Time: 2, 3, 4
Notes: Not found on any of the alternative sites.

Arctostaphylos hooveri [Ericaceae]
Common Name: Hoover's Manzanita
Status:[2] //List 4 Habit: shrub
Habitat: Chaparral
Counties: Monterey (MNT), San Luis Obispo (SLO)
Bloom Time: 1,2,3
Notes. Most often associated with stands of *Pinus ponderosa* at elevations greater than 1,300 feet. Suitable habitat for this plant was not found at any of the alternative reservoir sites. All the *Arctostaphylos* plants found in the alternative sites were identified except for one at the New Los Padres site. A check of this plant in January of 1990 was inconclusive.

Arctostaphylos montereyensis [Ericaceae]
Common Name: Toro Manzanita
Status: C2//List 1B Habit: shrub
Habitat: Chaparral, Coastal Scrub, Foothill Woodland
Counties: MNT, SLO
Bloom Time: 3,4
Notes: This plant is typically associated with Pleistocene sand dunes, a habitat type not found at any of the alternative reservoir sites.

TABLE 9-4 (Continued)

Arctostaphylos pumila [Ericaceae]
Common Name: Sandmat Manzanita
Synonym: *Arctostaphylos uva-ursi* ssp. *pumila*
Status: C2//List 1B Habit: shrub
Habitat: Closed-Cone Forest, Chaparral, Coastal Scrub (coastal dunes)
Counties: MNT
Bloom Time: 2, 3, 4
Notes: Known historically from Fort Ord and the Seaside/Marina area.

Ceanothus rigidus [Rhamnaceae]
Common Name: Monterey Ceanothus
Status: C2//List 4 Habit: shrub
Habitat: Closed-Cone Forest & Coastal Scrub (sandy hills & flats)
Counties: MNT, SCR
Bloom Time: 2, 3, 4
Notes: Not found on any of the alternative sites.

Centrostegia vortriedei [Polygonaceae]
Common Name: Vortriede's Spineflower
Status: //List 4 Habit: annual
Habitat: Foothill Woodland (dry places)
Counties: MNT, SLO
Bloom Time: 6,7,8,9
Notes. Suitable habitat for this plant consists of sandy and/or chalky soils on dry sites within Woodland communities. Although suitable habitat for this plant occurs at all of the alternative sites, it was not found during the surveys conducted during its blooming season.

Chorizanthe douglasii [Polygonaceae]
Common Name: Douglas' Spineflower
Status: //List 4 Habit: annual
Habitat: Foothill Woodland, Conifer Forest (sandy or gravelly slopes), below 5,000 ft.
Counties: MNT, SLO, San Benito (SBT)
Bloom Time: 4,5,6,7
Notes: See text.

Chorizanthe pungens var. *pungens* [Polygonaceae]
Common Name: Monterey Spineflower
Status: C2//List 1B Habitat: annual
Habitat: Coastal Dunes
Counties: ALA, MNT, SCR
Bloom Time: 4,5,6
Notes: Known from the dunes between Seaside and Marina.

TABLE 9-4 (Continued)

Chorizanthe robusta [Polygonaceae]
Common Name: Robust Spineflower
Status: //List 4 Habit: annual
Habitat: Coastal Scrub, Coastal Strand, below 1000 ft.
Counties: ALA, MNT, SCR, SMT
Bloom Time: 5, 6, 7, 8, 9
Notes: Not found on any of the alternative sites.

Clarkia lewisii [Onagraceae]
Common Name: Lewis' Clarkia
Status: //List 4 Habit: annual
Habitat: Coastal Scrub
Counties: MNT
Bloom Time: 5,6,7
Notes: See text.

Cordylanthus rigidus ssp. *littoralis* [Scrophulariaceae]
Common Name: Seaside Bird's-beak
Synonym: *Cordylanthus littoralis*
Status: C1/E/List 1B Habit: annual
Habitat: Chaparral, Closed-Cone Forest, Coastal Scrub (sandy soil)
Counties: MNT, SBA
Bloom Time: 7, 8, 9
Notes: Reported historically from sand hills between Seaside and Marina.

Cupressus macrocarpa [Cupressaceae]
Common Name: Monterey Cypress
Status: C2//List 1B Habit: tree
Habitat: Closed-Cone Forest (exposed headlands)
Counties: MNT
Bloom Time:
Notes: Known from only 2 native occurrences in the Monterey area. Not found on any of the alternative sites.

Ericameria fasciculata [Asteraceae]
Common Name: Eastwood's ericameria
Status: C2//List 1B Habit: shrub
Habitat: Closed-Cone Forest, Chaparral, Coastal Scrub
Counties: MNT
Bloom Time: 7,8,9,10
Notes: See text.

TABLE 9-4 (Continued)

Eriogonum nortonii [Polygonaceae]
Common Name: Pinnacles Buckwheat
Status: C3c//List 1B Habit: annual
Habitat: Chaparral, Valley Grassland (dry rocky slopes, often after fire), 1,500-4,000 ft.
Counties: MNT, SBT
Bloom Time: 3,4,5
Notes: See text.

Erysimum ammorphilum [Brassicaceae]
Common Name: Coast Wallflower
Status: C2//List 4 Habitat: biennial
Habitat: Coastal Dunes
Counties: MNT, SCR, SDG
Bloom Time: 2,3,4,5
Notes: Known from Monterey Bay but not found on any alternative sites.

Erysimum menziesii [Brassicaceae]
Common Name: Menzies' Wallflower
Status: C1/E/List 1B Habitat: biennial
Habitat: Coastal Strand (sand dunes)
Counties: HVM, MEN, MNT
Bloom Time: 3,4,5,6
Notes: Known from the dunes between Seaside and the Salinas River.

Fritillaria falcata [Liliaceae]
Common Name: Talus Fritillary
Status: C2//List 1B Habit: perennial
Habitat: Chaparral, Foothill Woodland, & Conifer Forest (serpentine talus), 1,000-3,000 ft.
Counties: MNT, SBT, Alameda (ALA), Santa Clara (SCL), Stanislaus (STA)
Bloom Time: 3,4,5
Notes: See text.

Fritillaria liliacea [Liliaceae]
Common Name: Fragrant Fritillary
Status: C2//List 1B Habitat: annual
Habitat: Coastal Scrub, Grassland (often serpentine)
Counties: widespread in Coast Range counties
Bloom Time: 2,3,4
Notes: Not found on any alternative sites

TABLE 9-4 (Continued)

Galium californicum ssp. *luciense* [Rubiaceae]
Common Name: Cone Peak Bedstraw
Status: C2//List 1B Habit: perennial
Habitat: Mixed Evergreen Forest, Conifer Forest
Counties: MNT
Bloom Time: 3,4,5,6,7
Notes: An endemic plant of Monterey County. Suitable habitat consists of Mixed Evergreen and Coniferous Forests above 3,500 feet. Suitable habitat does not occur at any of the alternative sites, and it was not found during the field surveys.

Galium clementis [Rubiaceae]
Common Name: Santa Lucia Bedstraw
Status: C3c//List 4 Habit: perennial
Habitat: Conifer Forest (dry rocky places), 3,200-5,800 ft.
Counties: MNT
Bloom Time: 6,7
Notes: Suitable habitat for this plant does not occur at any of the alternative sites, and it was not found during the field surveys.

Gilia tenuiflora ssp. *arenaria* [Polemoniaceae]
Common Name: Sand Gilia
Status: C1/T/List 1B Habitat: annual
Habitat: Coastal Scrub, Coastal Strand
Counties: MNT
Bloom Time: 4,5
Notes: Known from the dunes between Seaside and Marina.

Horkelia cuneata ssp. *sericea* [Rosaceae]
Common Name: Wedge-leaved Horkelia
Status: C2//List 1B Habit: perennial
Habitat: C^astal Scrub & Closed-Cone Forest (sandy & gravelly places)
Counties: ALA, MRN, MNT, SBA, SCR, SFO, SLO, SMT
Bloom Time: 4, 5, 6, 7, 8, 9
Notes: Not found on any of the alternative sites.

Juglans hindsii [Juglandaceae]
Common Name: Northern California Black Walnut
Status: C2//List 1B Habit: tree
Habitat: Riparian Forest, Riparian Woodland
Counties: Napa (NAP), Contra Costa (CCA), Sacramento (SAC)
Bloom Time: 4,5
Notes: Planted specimens were found in the New San Clemente site but are not considered sensitive because these trees were introduced into the area and do not represent native populations.

TABLE 9-4 (Continued)

Lomatium parvifolium [Apiaceae]
Common Name: Small-leaved Lomatium
Status: //List 4 Habit: perennial
Habitat: Closed-Cone Forest, Maritime Chaparral
Counties: MNT, SCR, SLO
Bloom Time: 2, 3, 4, 5
Notes: Not found on any of the alternative sites.

Lupinus abramsii [Fabaceae]
Common Name: Abram's Lupine
Status: //List 3 Habit: perennial
Habitat: Conifer Forest, Mixed Evergreen Forest (open woods), 2,000-5,000 ft.
Counties: MNT, SLO
Bloom Time: 5,6
Notes: See text.

Lupinus cervinus [Fabaceae]
Common Name: Santa Lucia Lupine
Status: C3c//List 4 Habit: perennial
Habitat: Conifer Forest, Oak Woodland (dry places), 1,000-4,500 ft.
Counties: MNT, SLO
Bloom Time: 5,6
Notes: See text.

Malacothamnus abbottii [Malvaceae]
Common Name: Abbott's Bush Mallow
Status: C2//List 1A Habit: shrub
Habitat: Riparian Scrub
Counties: MNT
Bloom Time: 6,7,8,9,10
Notes: Thought to be extinct, known only from the type collection along the Salinas River in 1889. Not found at any of the alternative reservoir sites.

Malacothamnus palmeri var. *involucratus* [Malvaceae]
Common Name: Carmel Valley Bush Mallow
Status: C2//List 1b Habit: subshrub
Habitat: Chaparral, Foothill Woodland
Counties: MNT, SLO
Bloom Time: 5,6,7,8
Note: See text.

TABLE 9-4 (Continued)

Malacothamnus palmeri var. *lucianus* [Malvaceae]
Common Name: Arroyo Seco Bush Mallow
Status: C2//List 1B Habit: subshrub
Habitat: Chaparral, Mixed Evergreen Forest (especially after fires)
Counties: MNT
Bloom Time: 5,6,7,8
Notes: Similar to *M. palmeri* var. *involucratus*. Not found on any of the alternative sites during the field surveys.

Malacothrix saxatilis var. *arachnoidea* [Asteraceae]
Common Name: Carmel Valley Malacothrix
Status: C2//List 1B Habit: subshrub
Habitat: Chaparral, Coastal Sage Scrub (Monterey shale substrate)
Counties: MNT, SBA
Bloom Time: 6,7,8,9,10,11,12
Notes: See text.

Microseris decipiens [Asteraceae]
Common Name: Santa Cruz Microseris
Status: C2//List 1B Habit: annual
Habitat: Coastal Prairie, Valley Grassland, Mixed Evergreen Forest, Closed-Cone Forest & Chaparral
Counties: MNT, MRN, SCR
Bloom Time: 4, 5
Notes: Known from the Seaside area.

Monardella undulata var. *undulata* [Lamiaceae]
Common Name: Curly-leaved Monardella
Status: //List 4 Habit: perennial
Habitat: Chaparral, Coastal Scrub, Coastal Dunes
Counties: MNT, MRN, SBA, SCR, SLO, SMT, SON
Bloom Time: 5, 6, 7
Notes: Not found on any of the alternative sites

Pinus radiata [Pinaceae]
Common Name: Monterey Pine
Status: //List 4 Habit: tree
Habitat: Closed-Cone Forest
Counties: MNT, SLO, Santa Cruz (SCR), San Mateo (SMT)
Bloom Time: 4
Notes. Planted specimens were found in the New San Clemente and San Clemente Creek sites. These populations are not considered sensitive because they were introduced to these sites and are not native groves. Native stands occur in the Cañada Reservoir site.

TABLE 9-4 (Continued)

Quercus lobata [Fagaceae]
Common Name: Valley Oak, California White Oak
Status: //List 4 Habit: tree
Habitat: Oak Woodland (valley bottoms & slopes), Riparian Forest, below 2,000 ft.
Counties: WIDESPREAD
Bloom Time: 2,3,4
Notes: See text.

Raillardella muirii [Asteraceae]
Common Name: Muir's Raillardella
Status: C3c//List 1B Habit: perennial
Habitat: Conifer Forest, Chaparral (open slopes) 4,000-7,000 ft.
Counties: MNT, Fresno (FRE), Kern (KRN), Tulare (TUL)
Bloom Time: 7
Notes: Known from Ventana Cones. Not found at any of the alternative reservoir sites during the field surveys.

Ribes divaricatum var. *publiflorum* [Grossulariaceae]
Common Name: Straggly Gooseberry
Status: //List 4 Habit: shrub
Habitat: Mixed Evergreen Forest, North Coast Conifer Forest
Counties: WIDESPREAD
Bloom Time: 2, 3, 4, 5
Notes: See Text.

Ribes sericeum [Grossulariaceae]
Common Name: Santa Lucia Gooseberry
Status: //List 4 Habit: shrub
Habitat: Redwood Forest, Oak Woodland, Mixed Evergreen Forest (along streams), below 1,000 ft.
Counties: MNT, SLO
Bloom Time: 2,3,4
Notes: See text.

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[1] Sources:

California Natural Diversity Data Base (CNDDB). Computer printout for the following USGS 7.5-minute quadrangle maps: Chualar, Spreckels, Seaside, Rana Creek, Carmel Valley, Mt. Carmel, Chews Ridge, Vetana Cones and Big Sur, June 10, 1989, and Moss Landing, Marina, and Seaside July 8, 1991.

See Appendix 9-E.

Biosystems Analysis, Inc., February 1991.

TABLE 9-4 (Continued)

[2] Federal/State/Other:
State:
California Endangered Species Act (1984), Native Plant Protection Act (1977), and the California Environmental Quality Act.
R = Rare. Plants that although not currently Threatened are in such small numbers or restricted habitats that they may become Threatened or Endangered if present conditions continue.
T = Threatened. Plants or animals likely to become Endangered in the foreseeable future in the absence of protection action(s).
E = Endangered. Seriously in danger of becoming extinct.

Federal:
Federal Endangered Species Act of 1973, as amended.
E = Taxa formally listed as Endangered.
T = Taxa formally listed as Threatened
C1 = Candidate taxa for which there is enough information to support the biological appropriateness of proposing to list as Threatened or Endangered.
C2 = Candidate taxa for which there is biological information that indicates that proposing to list the taxa as Threatened or Endangered is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate listing.
C3 = Taxa that are no longer under consideration for listing. There are three subcategories, depending on reason(s) for removal from consideration:
3A = Taxa believed to be extinct.
3B = Taxa with taxonomic problems that do not meet the Endangered Species Act definition of a "species."
3C = Taxa that are too common or widespread and/or those not subject to any identifiable threat(s).

Other:
Section 15380 of the California Environmental Quality Act [CEQA (September, 1983)] has a discussion regarding non-listed (State) taxa. This section states that a plant (or animal) must be treated as Rare or Endangered even if it is not officially listed as such. If a person (or organization) provides information showing that a taxa meets the State's definitions and criteria, then the taxa should be treated as such in an EIR.

The California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants (1985).

List 1 = Plants of Highest Priority
List 1A = Plants presumed Extinct in California.
List 1B = Plants Rare or Endangered in California and elsewhere.
List 2 = Plants Rare or Endangered in California, more common elsewhere.
List 3 = Plants for which more information is needed.
List 4 = Plants of limited distribution (a watch list).

alternative reservoir sites or those with a moderate to high potential of occurring at these sites. Please refer to Tables 9-3 and 9-4, and Appendix 9-C for more details on all the sensitive status species surveyed.

Wildlife

Spotted Owl (*Strix occidentalis*). This owl is a resident of dense, old-growth forests and woodlands. The nearest active roosting/nesting sites are in the Chews Ridge-China Camp area and in Robinson Canyon. Don Roberson (noted birder of Monterey County) has visited New San Clemente and New Los Padres alternative sites and reports that he is doubtful that this owl occurs in the New San Clemente and New Los Padres sites due to a limited amount of suitable habitat.[25] Mr. Roberson has never seen or recorded the spotted owl in bird surveys he has conducted in these areas, however, he cautions that he did not use taped calls of this owl during these survey efforts. Mr. Roberson does feel it is more probable that this owl would be found in the San Clemente Creek site than in the other sites noted above. Suitable habitat for this owl is limited or nonexistent in the Cachagua and Chupines Creek sites. A total of four nocturnal surveys (approximately 22.5 hours) of the Cañada study area were conducted (see Appendix 9 C). These surveys were conducted on August 13, 19-20, 26-27, and 31, and September 1, 1990. The presence of owls was determined by eliciting vocal responses from owls by broadcasting tape recordings of spotted owl calls. Although most calling stations were located in the inundation area, several adjacent sites were also surveyed.

No California spotted owls were located at the Cañada site, which is the only site where a formal survey with taped calls was conducted. Based on vegetation structure and topographic features, several portions of this project area appear to provide at least marginal habitat for the California spotted owl. The limited extent and fragmented pattern of appropriate forest stands may be the primary habitat components reducing the value of the Cañada site

Great-horned owls were found in almost all forested sections of the Cañada project area. Great horned owls are known to be one of the few predators of spotted owls. While the two species do coexist, the abundance and ubiquitous distribution of great horned owls in the proposed reservoir area lowers the site's suitability for spotted owls.

Least Bell's Vireo (*Vireo bellii pusillus*). This small passerine bird is classified as endangered by the USFWS. It was once considered common to abundant in riparian ecosystems throughout much of California, but it is now limited to just 300 breeding pairs in California.[26] The decline of this bird is believed to be related to the loss of riparian habitat throughout the state and to increased parasitism by the brown-headed cowbird. There does not appear to be any published information indicating that this bird ever nested on the Carmel River.[27] The least Bell's vireo was known to occur on the Salinas River in southern Monterey County in the first part of this century. Subsequent surveys in the 1970s did not locate the species, however, a small breeding population was rediscovered in the early 1980s around Bradley.[28] Because there appeared to be suitable habitat for the species on the Carmel River, and vagrant males have been sighted in the Monterey Peninsula area, a specific survey was conducted.[29] No least Bell's vireos were found during this survey effort. The best potential habitat for this rare bird occurs near and just downstream of the Cal-Am water filter plant. The entire survey report is presented in Appendix 9-C.

Peregrine Falcon (*Falco peregrinus*). This bird is classified as endangered by both the USFWS and the CDFG. It is a rare migrant and winterer, and very rare breeder in Monterey County. This bird was once much more common in the Monterey area, however, its numbers have decreased due to pesticide poisoning, shootings, and nest-robbing for falconry. A recent effort to protect known nests and a captive-bird release program has successfully reversed the downward trend. The historical and known existing nesting areas in Monterey County are along the coast and in wilderness areas, and do not include the Carmel River drainage.[30]

Peregrine falcons may occur throughout Monterey County but are most often seen in areas that have flocks of shorebirds or ducks. These birds typically breed near marshes, lakes, rivers or other water features, and on ledges or potholes on high cliffs with a commanding view. They will nest occasionally in tree hollows or in old raptor nests. Peregrine falcons have a cosmopolitan distribution pattern and occur in a wide variety of habitats.[31]

A male bird was observed in flight and perched on a large sycamore snag in the vicinity of the existing San Clemente Reservoir in 1985. This bird may have been migrating through the area or may have been wintering in the area. It is unlikely, although possible, that it breeds in the area, because there are no cliff areas in the immediate vicinity of the reservoir.

Golden Eagle (*Aquila chrysaetos*). This large raptor is a fully protected species in California. It is unlawful to take this bird or destroy its nesting sites without a special permit from the California Department of Fish and Game. A nest was located in a Monterey pine tree located outside of the reservoir inundation area at the Cañada site. Two adults and two young fledglings were observed at this nest in 1989. However, no eagles were observed at this nest during a second visit in 1990.

Northern Harrier (*Circus cyaneus*). This raptor typically nests in open habitats associated with marshy areas. Suitable nesting habitat was minimal at all the reservoir sites. This bird was observed at the Cañada Reservoir site during field surveys in May of 1990.

Black-Shouldered Kite (*Elanus caerule*). This small raptor prefers rolling foothills and margins of valleys with river bottomlands or marshes. This bird was sighted at the Cañada Reservoir study area during field surveys in May of 1990.

Sharp-Shinned Hawk (*Accipiter striatus*). This hawk nests in dense stands of conifers. It was sighted in flight at the New San Clemente Reservoir site. A male and female of this species were recorded below the existing dam site on July 2, 1989.

Cooper's Hawk (*Accipiter cooperi*). This hawk nests in riparian and live oak communities. It was observed on August 6, 1989 at the San Clemente Creek site and may nest in the reservoir area.

Yellow Warbler (*Dendroica petechia*). This bird nests in riparian habitats dominated by willow trees. It was recorded at the Cañada (May 14), New San Clemente (July 1), New Los Padres (May 28) and Chupines Creek (June 23) sites, all in 1989. All of these areas included suitable nesting habitats for this bird.

Smith's Blue Butterfly (*Euphilotes enoptes smithii*) This species of butterfly is known to occur in two types of localities along the Central California coastline. the more typical immediate coastal localities and in more inland sites similar to the locations of the alternative reservoir sites. The inland sites where this butterfly has been found are characterized by a mosaic of coastal scrub and grassland habitat types that support at least one of the two host plants used by this species – dune buckwheat (*Eriogonum parvifolium*) or the coastal buckwheat (*Eriogonum fasciculatum*) as a food

plant.[32] The location of colonies of the Smith's blue butterfly usually correspond to the distribution of buckwheat plants used by this species, although not all suitable habitats are occupied.[33]

Two separate survey efforts for the Smith's blue butterfly were conducted on the various project alternative sites: Dr. Richard Arnold conducted surveys on all the alternative sites except the Cañada Reservoir site, which was surveyed by Thomas Reid Associates. Please refer to the reports prepared by these consultants in Appendix 9-C for details on the survey methods and life history information on this species. The following is a brief summary of results and conclusions presented in the reports noted above.

Dr. Arnold did not find any specimens of Smith's blue butterfly at the five alternative reservoir sites surveyed. He concluded that suitable habitat for this butterfly does not occur at the San Clemente Creek, Chupines Creek, and Cachagua Creek sites, and thus it is unlikely the butterfly would occur at any of these three sites. The New San Clemente and New Los Padres Dam sites do support large populations of the California buckwheat. However, Dr. Arnold concluded that the probability of the Smith's blue butterfly inhabiting either of these sites is relatively low, due to the fact that this secondary food plant of the butterfly occurs in chamise chaparral rather than the preferred coast scrub communities, and the fact that the closely related Tilden's blue butterfly (*E. e. tildeni*) was found at both these sites. Dr. Arnold recommended that follow-up surveys be conducted at these two sites in July or early August to make a more definitive conclusion on the presence or absence of this species at these sites.

Surveys of the New Los Padres site during the week of July 14, 1991, failed to locate any specimens of Smith's Blue although a number of individuals of Tilden's Blue were found. Dr. Arnold feels that it is highly unlikely that Smith's Blue occurs on this site.[34] Dr. Arnold also surveyed the New San Clemente sited and found one Smith's Blue individual above the inundation line. Searches below the line failed to locate more individuals and Dr. Arnold believes the one individual found may be a stray.

The surveys at the Cañada Reservoir site located patches of the dune buckwheat large enough to support a population of the Smith's blue butterfly in the grassland areas around the periphery of the project area. Field checks of these patches during optimal conditions for adult flight resulted in no observations of the Smith's blue butterfly. Field surveys at other known locations of this

butterfly during the same time period were positive, indicating and verifying the negative findings at the Cañada site.

The desalination plant included in some alternatives consists of pipelines and radial wells that would be sited in the Marina Dunes area and that could have an affect on sensitive plant and animal species. Smith's Blue is known from the Marina Dunes near Marina to the Lone Star plant. The entire area is considered prime habitat for this endangered species. The Marina Dunes supports one of the largest remaining colonies of Smith's Blue.[35]

Black Legless Lizard (*Anniella pulchra nigra*). The black legless lizard is classified as endangered by the California Department of Fish and Game (CDFG), and listed as Endangered by the USFWS. It has a limited range, extending from Monterey to Morro Bay. Its preferred habitat is sand dunes or river washes where there are clumps of beach grass, bush lupins, or other shrubs. This lizard is present in the immediate vicinity of the Carmel River Lagoon.[36] The various reservoir alternatives are not expected to have any effect upon the preferred habitat of this species, and thus a specific survey effort for this lizard was not conducted.

Black legless lizards have been found at several locations between Marina State Beach and the RMC Lone Star property. This area would be the site of the radial wells associated with the desalination portion of some alternatives. In the same area there are also extensive areas of habitat considered excellent to good for this species.[37]

Red-Legged Frog (*Rana aurora draytoni*). This small frog inhabits quiet pools, streams, marshes and occasionally ponds in the coastal region of California. Its populations have been on a decline throughout its range due to the loss of suitable habitat and predation by introduced exotic species, in particular the bullfrog (*Rana catesbeiana*). Adults and larvae were observed in San Clemente Creek from just above San Clemente Reservoir upstream to the man-made pond on the Dormandy Ranch on July 2 and August 6, 1989. Additional sightings of this species are reported to occur along the Carmel River below the existing San Clemente Dam, downstream of Pine Creek and upstream of the Los Padres Dam in the Danish Creek area.[38]

Foothill Yellow-Legged Frog (*Rana boylei*). This small frog is typically found in or near streams with a rocky bed. Populations of this species have been on the decline in California due to the

loss of its preferred habitat. Larvae of this species was observed in the upper reaches of the Los Padres Reservoir where the Carmel River enters the reservoir on May 27, 1989.

<u>Southwestern Pond Turtle (*Clemmys marmorata pallida*)</u>. This aquatic turtle prefers the quiet waters of ponds, small lakes and sluggish streams but may also be found in rivers, marshes and reservoirs. These turtles were observed basking in the upper Carmel River above the San Clemente Reservoir on July 1, 1989. Populations of this turtle were reported to occur in the man-made pond on San Clemente Creek and in pools along Cachagua Creek by local residents. Dave Dettman (Fisheries Biologist) of the MPWMD reports seeing large concentrations of pond turtles in the Carmel River just upstream of the Narrows and in the Garland Park area.

<u>Coast Horned Lizard (*Phrynosoma coronatum frontale*)</u>. This lizard occupies a variety of habitat types in the Central Coast region. It is common in some areas and uncommon in others. It was recorded at the San Clemente Creek site August 6, 1989, and reported by the landowner to occur in the New San Clemente and Chupines Creek sites.

A mountain lion (*Felis concolor*) was flushed from the understory in the Cañada Reservoir site. Sightings of mountain lions have also been reported at the Cachagua Creek, Chupines Creek and San Clemente Creek sites by the landowners.

In addition to the sensitive wildlife species noted above, these sites support a number of wildlife species that are hunted including California quail (*Callipepla californica*), Mourning dove (*zenaida macrourv*), band-tailed pigeon (*Columba fasciata*), wild turkey (*Meleagris*), feral pig (*Sus scrofa*), and black-tailed deer (*Odocdileus hemrionus*).

The greatest numbers of sensitive wildlife species were found in the New San Clemente and Cañada sites. No sensitive wildlife species were found at the Cachagua site and only one was found at the Chupines site. Three sensitive wildlife species were located at the New Los Padres and San Clemente Creek sites. Of those sensitive wildlife species found at the various alternative sites, the species with the most sensitive status are the red-legged frog and the southwestern pond turtle. The occurrence of these species at the New Los Padres, San Clemente Creek, and New San Clemente sites would contribute to the significance of these sites in comparison to the other

alternative sites. A summary of those sensitive wildlife species found at each alternative site is provided in Table 9-5.

Although none of the other special status wildlife species were observed during the biological surveys for this report, habitats present on some sites may provide sufficient areas wherein one or more listed or candidate species might exist.

A combination of criteria was used to rate the potential for each alternative reservoir site to provide for the existence of sensitive wildlife species. These included:

- o documented historical records of sensitive species in the project region;
- o the availability within the inundation area or its immediate surroundings of habitats suitable for the maintenance and/or breeding of sensitive wildlife species;
- o reliably reported sightings by local residents or other knowledgeable persons; and
- o sightings of sensitive species during surveys for this report.

Using these criteria, the qualitative probability that a particular sensitive species might inhabit a particular area can be estimated. For example, the presence of good habitat, historical records of a species in the region, and sightings by reliable observers indicate a high probability that a particular sensitive species inhabits the area. The availability of only limited habitat plus historical records of a species presence in the area indicate a moderate to low probability that a sensitive species might be present.

The lack of any positive criteria indicates the probable absence of a species from the area. Thus, as in the case for this study, if Smith's Blue Butterflies and the buckwheat plants on which they feed were not found, it was assumed that the species did not occur on the site. However, the availability of less preferred buckwheat food plants might indicate a low probability that this endangered species might be present under marginal conditions. Obviously, if a sensitive species was observed during any field survey for this report it was listed as present.

Using this subjective method of analysis, the Cachagua, San Clemente Creek and New Los Padres sites are estimated to contain the greatest potential (moderate to high) of providing the ecologic

TABLE 9-5

PROBABILITIES OF OCCURRENCE OF LISTED ENDANGERED, THREATENED AND CANDIDATE WILDLIFE SPECIES ON PROPOSED ALTERNATIVE SITES FOR THE NEW SAN CLEMENTE DAM PROJECT, MONTEREY COUNTY, CALIFORNIA

Taxa	Status[1]	Site[2] NLP	CAC	SCC	CHU	NSC	CAN
MAMMALS							
Pacific western big-eared bat (*Plecotus townsendii townsendii*)	SSC3/C2/	L	L	L	L	L	L
Greater western mastiff bat (*Eumops perotis californicus*)	SSC3/C2/	M	M	M	M	M	M
Pallid bat (*Antrozous pallidus*)	SSC3/ /	M	M	M	M	M	M
American badger (*Taxidea taxus*)	SSC3/ /	O	O	O	O	O	O
BIRDS							
American peregrine falcon (*Falco peregrinus anatum*)	CE/E/CFP	M	M	M	M	P	M
Golden eagle (*Aquila chrysaetos*)	SSC3/ /CFP	O	O	O	O	O	P
Bald eagle (*Haliaeetus leucocephalus*)	CE/E/CFP	M	O	O	O	M	O
Spotted owl (*Strix occidentalis*)	SSC2/T	L	L	M	O	L	O
Northern harrier (*Circus cyaneus*)	SSC2/ /	O	O	O	O	O	P
Black-shouldered kite (*Elanus caerulea*)	/ /CFP	O	O	O	O	O	P
Sharp-shinned hawk (*Accipiter cooperi*)	SSC3/ /	O	O	O	O	P	O

TABLE 9-5 (Continued)

Taxa	Status[1]	Site[2] NLP	CAC	SCC	CHU	NSC	CAN
Cooper's hawk (*Accipiter cooperi*)	SSC3/ /	M	M	P	L	M	L
Burrowing owl (*Athene cunicularia*)	SSC2/ /	O	O	O	O	O	O
Short-eared owl (*Asio flammeus*)	SSC2/ /	L	L	L	L	L	L
Yellow warbler (*Dendroica petechia*)	SSC/ /	P	M	M	P	P	P
Tricolored blackbird (*Agelaius tricolor*)	/C2/	L	L	L	L	L	L
Least bell's vireo (*Vireo bellii pusillus*)	CCE/E/	L	L	O	L	O	L
AMPHIBIANS							
California tiger salamander (*Ambystoma tigrinum californiense*)	SSC2/C2/	L	M	L	M	L	L
Red-legged frog (*Rana aurora draytoni*)	SSC2/C2/	P	M	P	M	P	L
Foothill yellow-legged frog (*Rana boylei*)	SSC2/ /	P	L	M	L	M	L
REPTILES							
Southwestern pond turtle (*Clemmys marmorata pallida*)	SSC/C2/	M	H	H	O	P	L
Black legless lizard (*Anniella pulchra nigra*)	CCE/E/	O	O	O	O	O	O
Coast horned lizard (*Phrynosoma coronatum frontale*)	SSC/ /	M	M	P	H	H	M

TABLE 9-5 (Continued)

Taxa	Status[1]	Site[2] NLP	CAC	SCC	CHU	NSC	CAN
INSECTS							
Smith's blue butterfly (*Euphitoles enoptes smithi*)	/E/	O	O	O	O	L	L

[1]See Table 9-3 for complete list of status definitions.

[2]Sites: NLP = New Los Padres - Field Survey, May 28-29, 1989
CAC = Cachagua Creek - Field Survey, August 7, 1989
SCC = San Clemente Creek - Field Survey, July 2 and August 6, 1989
CHU = Chupines Creek - Field Survey, June 23, 1989
NSC = New San Clemente - Field Survey, July 1-2, 1989
CAN = Cañada Reservoir - Field Survey, May 14, 17, 18 and 29, 1990

KEY: O = absent; L = low probability; M = moderate probability; H = high probability; P = known to be present.

requirements of the largest numbers of sensitive species. The New San Clemente, Cañada and Chupines Creek sites may potentially support lower numbers of wildlife sensitive species. A summary of the potential of each proposed alternative reservoir site to contain sensitive species is provided in Table 9-5.

In considering both the number and status of sensitive wildlife species found at each alternative site and the potential of these sites to support other sensitive wildlife species, the relative sensitivity of each site may be ranked as follows, most sensitive are New San Clemente, San Clemente Creek, New Los Padres and Cañada; the least sensitive are the Chupines and Cachagua Creek sites.

Observations along the entire pipeline route of the two alternative desalination on July 6-7, 1991 indicated that habitats capable of supporting sensitive wildlife species might be affected. The area around Dolan Road and Moro Cojo Slough just east of Moss Landing contains a rich assemblage of salt and fresh water marsh vegetation which could provide for occasional or permanent use by a number of sensitive wildlife species known to occur in the Moss Landing region. These include the California tiger salamander (*Ambystoma tigrinum californiense*)[CSC/C2/], Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*)[E/E/], California clapper rail (*Rallus longirostris obsoletus*)[E/E/], short-eared owl (*Asio flammeus*)[CSC//], and tidewater goby (*Eucyclogobius newberryi*)[CSC/C2/]. The probability of the occurrence of these species, while extremely low at this location, cannot be completely discounted since they are all known to have occurred in similar habitats near Elkhorn Slough and similar estuarian situations near Moss Landing.

The sensitive species most likely to be encountered at some point along the proposed pipeline routes for a desalination plant would be the black legless lizard (*Anniella pulchra nigra*)[CSC/C2/]. The probability of their occurrence is very high in sandy loam habitats along Reservation Road, through the Fort Ord dunes area and in the beach dunes area proposed for the radial well seawater collectors. Lower probabilities exist for other areas along the pipeline routes to and from the existing MRWPCA Water Treatment Plant proposed as a possible site for the desalination facility.

Beach habitats seaward of the dunes in the area proposed for the radial wells appear to be ideally suited for the nesting of the snowy plover (*Charadrius alexandrinus nivosus*)[CSC/C2/]. This species is known to nest on isolated beaches in this area.

Plants

Eastwood's Goldenweed (*Ericameria fasciculata*). This stout dense shrub is a Monterey County endemic that is restricted to the sand dunes and coastal strand of Monterey and Carmel Bays. It is classified as a candidate for listing by the USFWS, and has sufficient biological information to support a proposal to list at the present time. The reservoir alternatives are expected to have very little, if any, effect upon the preferred habitat of this species and thus a specific survey effort for this plant was not conducted. A limited survey of the immediate dunes at the mouth of the Carmel River did not locate this plant. Fipelines for the desalination alternatives may have an impact on this species and a survey will need to be conducted.

Carmel Valley Bush-Mallow (*Malacothamnus palmeri* var. *involucratus*). This perennial shrub grows from 3 to 6 feet in stature. It is endemic to the interior portions of the Santa Lucia Mountains in Monterey County. It is listed by the U.S. Fish and Wildlife Service as Category 2, indicating further study is needed before a final ruling on its legal status can be made. It favors chaparral or oak woodland habitats and is reported to be common after a burn.[39] Although this plant has been found in the Carmel Valley, it is also reported to be much more common in the Jolon area and on the Salinas Valley side of the Santa Lucia Mountains.[40] During the field surveys for this report, known localities for this plant were visited throughout its blooming season. This plant was located within the project study area of the Cañada Reservoir site. Suitable habitat does occur throughout the other sites, and isolated individuals may occur within the reservoir inundation areas. However, since this plant is typically rather large in size, it is believed that if this plant were to occur within the chaparral, it would have been noticeable.

Carmel Valley Malacothrix (*Malacothrix saxatilis* var. *arachnoidea*). This plant was found in the Chupines Creek inundation area only (See Figure 9-6 and Appendix 9-C) This is within the plant's range, which is the Carmel Valley from near the Farm Center east to the Marble Ranch. It grows on Monterey shale substrate in Coastal Sage Scrub and Chaparral, and aside from the Chupines Creek populations, is known only from roadcuts. In the study area it was found in

three locations. One group of about 50 plants was seen growing on Monterey shale in a roadcut one-quarter mile north of the Wilson home, in Coastal Sage Scrub. The other two populations, however, were in areas where the soil structure was uninfluenced by human activity, and may constitute the only known locations where this plant so occurs. One of these stations, near the north bank of Chupines Creek in the Coastal Sage Scrub/Oak Woodland ecotone one-half mile northeast of the Wilson barn, consisted of ca. 12 plants growing in eroded Monterey shale alluvium. The third location for this plant, also well away from human disturbance, was in Coastal Sage Scrub on a steep slope of loose rocky soil (from Monterey shale) on the west-facing slope 100 years east of Chupines Creek, and three-quarters mile northeast of the Wilson barn. Ca. 70 plants were seen at this station. Monterey shale was also found in the Cachagua inundation area, near the Search Ranch, but no plants could be found after a thorough examination on 7 August. This plant is on CNPS List 1B and Federal List C2, and blooms from June to December.

Douglas' Spine Flower (*Chorizanthe douglasii*). This plant was seen at the San Clemente Creek inundation area only. It was found growing in disturbed soil on a steep slope covered with Chamise Chaparral about 300 yards east of the pond on the Dormody property, on the north side of San Clemente Creek. This population consisted of 30 plants. It has a wide distribution in the Santa Lucia in Monterey County, and also occurs in the Salinas Valley and the Gabilan Mountains. It blooms from April to June. It is on the CNPS List 4.

Monterey Spine Flower (*Chorizanthe pungens* var. *pungens*). The Monterey spine flower is a small annual plant that occurs in coastal dunes. It is a federal candidate species and is on the CNPS List 1B. It is recorded from Seaside to the dunes at the mouth of the Pajaro River north of Moss Landing Some of these records are historical and those populations may now be extirpated. The species is known from the Marina dunes in several locations and could be affected by a desalination plant at the MRWPCA site [41]

Lewis' Clarkia (*Clarkia lewisii*). This plant was seen at all sites except the Chupines Creek and Cañada Reservoir sites. It may occur there as well, although the area is heavily grazed In other areas, however, it was seen in large numbers. Individual stands of this taxon included from several to many hundreds of plants. It has a wide distribution in Monterey County, and has recently been found to occur just inside San Benito County. In the study areas it was seen growing in disturbed

soil in Chaparral and open Oak Woodland habitats. Principle blooming period is May to July. It is on CNPS List 4.

Valley Oak (*Quercus Lobata*). This tree was found at all sites except the San Clemente Creek and Cañada Reservoir sites. A very few scattered individuals may occur there, but they do not constitute a significant element of the area's vegetation. It was found to be virtually ubiquitous in the other study areas, however, and for this reason was not mapped for this report. All sites where it was found were subject to moderate to heavy livestock grazing, with the exception of the Cachagua inundation area, where little grazing occurs within *Q. lobata's* distribution there. The finest stands of mature trees were seen in the New Los Padres and New San Clemente inundation areas. Few saplings were seen in the study area. At the New Los Padres study area, the abundant *Q. lobata* "yearlings" (from acorns germinated this year) seen in June were *all* gone when the area was re-examined in September, presumably due to the grazing which occurs there. This plant is found on CNPS List 4.

Santa Lucia Gooseberry (*Ribes sericeum*). This brush plant occurs in the Santa Lucia Range from Hastings Reservation south into San Luis Obispo County. Its habitat is redwood forest, oak woodland, and mixed evergreen forest, and it was found growing in the latter two habitats in the San Clemente Creek inundation area last year. These two habitats are also present in the New Los Padres study area, but no examples of the plant were seen there. It blooms from February to April, and is on CNPS List 4.

Straggly Gooseberry (*Ribes divaricatum* var. *pubiflorum*). Straggly gooseberry is on List 4 of the CNPS. It is not listed by the U.S. Fish and Wildlife Service or the State of California. Straggly gooseberry (var. *pubiflorum*) occurs in the Coast Ranges from Santa Barbara County to southern Oregon. It is a weakly ascending or trailing shrub generally found in or around the margins of rich, moist forests. Unlike the typical variety [*R. divacaricatum* var. *divaricatum*], var. *pubiflorum* does not have large sections of undisturbed habitat. However, recent field work by botanists indicates that straggly gooseberry is relatively common. A large, concentrated population occurs in the riparian forest on the north bank of the Carmel River in the vicinity of the proposed intake facility and pump station of the Cañada site. A much smaller colony, consisting of only a few plants, occurs on a nearby small island in the Carmel River channel. This plant was also found at the New Los Padres, Chupines Creek and Cachagua Creek sites.

Talus Fritillary (*Fritillaria falcata*). This perennial herb typically occurs on talus slopes and on serpentine soils in chaparral, oak woodlands and Lower Montane Coniferous Forest communities. Serpentine soils and Lower Montane Coniferous Forest habitats do not occur at any of the alternative reservoir sites. Talus slopes in Oak Woodlands and Chaparral habitats do occur at all but the Chupines and Cachagua Creek sites. This plant was not found during a field survey of the New Los Padres Site during the blooming period of this plant. It may occur at the New San Clemente and San Clemente Creek sites. Additional field work is needed to determine if this plant occurs at these sites.

Fragrant Fritillary (*Fritillaria liliacea*). Fragrant fritillary is a perennial bulb species that is found in coastal scrub and grassland in a number of coastal California counties where it is often associated with serpentine derived soil. It is a federal candidate species and was not found on any of the alternative sites.

Pinnacles Buckwheat (*Eriogonum nortonii*). This small annual herb has a limited distribution and is known to occur in only two localities in Monterey County. One of its known locations is at the University of California Hastings Reservation near the Cachagua Creek site. It typically occurs on dry rocky ridges, serpentine soils, and in areas that have recently been burned. Although no serpentine soils or recently burned areas occur within any of the alternative sites at the time of the field surveys, suitable rocky habitats do occur in all but the Chupines Creek sites.

This plant was not found during a field survey of the New Los Padres site during its blooming period. It may occur at the New San Clemente, San Clemente Creek, and at the Cachagua Creek sites. Additional field surveys are needed to determine if this plant occurs at these sites.

Abram's Lupine (*Lupinus abramsii*). This perennial plant typically occurs in the Lower Montane Coniferous and Mixed Evergreen Forest in the Santa Lucia Mountains between 2,000 and 5,000 feet. Suitable habitats for this plant do not occur at the Chupines or Cachagua Creek sites. Habitats at New San Clemente, New Los Padres and San Clemente Creek sites are marginal at best. This plant was not found at the New Los Padres site during field surveys conducted during its blooming period. Although it is very unlikely, it may occur at the New San Clemente and San Clemente Creek sites.

Santa Lucia Lupine (*Lupinus cervinus*). This perennial plant typically occurs in Lower Montane Coniferous Forests and Oak Woodlands above 1,000 feet. The Oak Woodlands and Mixed Hardwood Forests that occur at all the alternative sites could support this plant, even though these sites occur at the lowest end of this species' elevation range. A field survey of the New Los Padres site during this plant's blooming period failed to locate any populations within the site. Additional field survey efforts at the remaining sites are needed to determine if this plant occurs at these sites.

Sandmat Manzanita (*Arctostaphylos pumila*). This low, prostrate shrub is known historically from the dunes from Seaside north through Fort Ord. A number of populations of the species have been extirpated by road building and military activities. A brief survey of the desalination alternatives did not locate this species but a more thorough survey should be done before construction would start.

Seaside Bird'-beak (*Cordylanthus rigidus* ssp. *littoralis*). This annual member of the Snapdragon Family is historically known from one location in the sand hills north of Seaside. This population has not been seen recently and may be extirpated. It was not found in the Marina Dunes Habitat Conservation Plan (HCP) but habitat along the desalination pipeline routes could support this species. A survey for it should be made since it is a federal C1 species and there is enough information on hand to support its listing as endangered or threatened.

Menzies' Wallflower (*Erysimum menziesii*). This biennial species grows in the coastal strand community at locations from Humboldt to Monterey County. It has been nearly extirpated from the Monterey Peninsula but it is known both historically and currently from the dunes between Seaside and the Salinas River. It is reported from the Marina Dunes HCP.[42] This species could be affected by a desalination plant at the MRWPCA site and a survey for it should be made at the appropriate time of the year.

Sand Gilia (*Gilia tenuiflora* ssp. *arenaria*). Sand Gilia grows in the dunes of the coastal strand and coastal scrub communities of Monterey County. It is known from Monterey to the Salinas River and is found in the Marina Dunes.[43] This state listed threatened species could be affected by construction of a desalination plant at the MRWPCA site.

Santa Cruz Microseris (*Microseris decipiens*). This annual member of the daisy family is known from coastal prairie and valley grassland communities among others. It is known from one location just east of Monterey and habitat along the desalination pipeline routes could support this species.

Additional Plants of Interest. Two anomalous plants were seen during the surveys. A Lomatium, which may be *L. parvifolium* var. *parvifolium*, was found along the Carmel River Trail on the west side of the river one-quarter mile northwest of Bluff Camp. Although well above the inundation area, this location may be heavily impacted by the proposed service road, which would extend to Bluff Camp. *L. p.* var. *parvifolium* is on CNPS List 4; however, the material seen at the project site varied considerably from the typical form. A specimen was sent to Dr. Lincoln Constance, at the University of California Herbarium, for determination because the plant is not clearly referable to any typical lomatiums. About 12 specimens were seen growing in an area 4 feet by 10 feet in semishaded Oak Woodland. The other plant, a bedstraw, was seen in the Bluff Camp area only. This location, also above the inundation area, would be the terminus of the proposed road and would have a fishery-related facility as well. The bedstraw found here, which could be a hybrid of *Galium californicum* ssp. *californicum* x *G. c.* ssp. *flaccidum* (both of which occur in the study area), does not satisfactorily compare to the morphology of known taxa, and a specimen was sent to Dr. Lauramay Dempster of the U.C. Herbarium.

Approximately the same number of sensitive plant species were found at each of the alternative reservoir sites. However, the Cañada and Chupines Creek sites do support species with the greatest sensitivity status and thus are more sensitive when compared to the other alternative sites.

A combination of criteria was used to rate the potential for the existence of sensitive plant species at each alternative reservoir site. These included:

- o documented historical records of sensitive species in the project region;
- o the availability within the inundation area or its immediate surroundings of habitats suitable for the maintenance and/or breeding of sensitive wildlife species;
- o sightings of sensitive species during surveys for this report.

Using these criteria, the probability that a particular sensitive species might occur at a particular site was estimated. For example, the presence of good habitat, historical records of a species in the region, and sightings in the vicinity of the site indicate a high probability that a particular sensitive species occurs in the area. The availability of only limited or marginal habitat plus historical records of a species' presence in the area indicate a moderate to low probability that a sensitive species might be present.

The lack of suitable habitat indicates the probable absence of a species from the area. Obviously, if a sensitive species was observed during any field survey for this report it was listed as present.

Using this subjective method of analysis, the San Clemente Creek, New San Clemente and Cachagua Creek reservoir sites have the potential of supporting the greatest numbers of rare plant species, while the New Los Padres, Cañada and Chupines sites have the potential of supporting the least number of sensitive plant species.

A summary of the rare plant survey results and the evaluation of occurrence potential is provided in Table 9-6.

In considering the presence, status and potential for occurrence of sensitive plant species at each alternative reservoir site, the relative sensitivity of each site is as follows: most sensitive are Cañada and Chupines Creek; moderately sensitive are San Clemente, New San Clemente and Cachagua; least sensitive is New Los Padres. Any alternative that calls for the construction of a desalination plant could have considerable impacts to biological resources since the radial well locations in the Marina Dunes could affect sensitive plant and animal species or their habitat.

9.2 IMPACTS OF PROJECT FACILITIES

This section of the chapter identifies those impacts to vegetation communities, wildlife habitats and sensitive species associated with the construction and placement of project features. At this time preliminary designs and construction plans have been prepared on the various project alternatives.[44] For many of the alternatives, certain project features, such as access roads and borrow sites, have been described but the location has not been finalized. These project features are addressed in

TABLE 9-6

PROBABILITIES OF OCCURRENCE OF SENSITIVE PLANT SPECIES IN PROPOSED ALTERNATIVE RESERVOIR SITES

Taxa	Status[1]	Site[2]					
		NLP	CAC	SCC	CHU	NSC	CAN
Hickman's Onion (*Allium hickmanii*)	C1/ /List 1B	O	O	O	O	O	O
Hooker's Manzanita (*Arctostaphylos hookeri* ssp. *hookerii*)	/ /List 3	L	O	O	O	O	O
Hoover's Manzanita (*Arctostaphylos hooveri*)	1/List 4	L	O	O	O	O	O
Toro Manzanita (*Arctostaphylos montereyensis*)	C2/List 1B	O	O	O	O	O	O
Sandmat Manzanita (*Arctostaphylos pumila*)	C2/ /List 1B	O	O	O	O	O	O
Monterey Ceanothus (*Ceanothus rigidus*)	C2/ /List 4	O	O	O	O	O	O
Vortriede's Spineflower (*Centrostegia vortriedei*)	/ /List 4	O	O	O	O	O	O
Douglas' Spineflower (*Chorizanthe douglasii*)	/ /List 4	O	O	P	O	O	O
Robust Spineflower (*Chorizanthe robusta*)	/ /List 4	O	O	O	O	O	O
Lewis' Clarkia (*Clarkia lewisii*)	/ /List 4	P	P	P	L	P	O
Seaside Bird's-Beak (*Cordylanthus rigidus* ssp. *littoralis*)	C1/E/List 1B	O	O	O	O	O	O
Monterey Cypress (*Cupressus Macrocarpa*)	C2/ /List 1B	O	O	O	O	O	O
Eastwood's Ericameria (*Ericameria fasciculata*)	C2/ /List 1B	O	O	O	O	O	O

TABLE 9-6 (Continued)

Taxa	Status[1]	Site[2] NLP	CAC	SCC	CHU	NSC	CAN
Pinnacles Buckwheat (*Eriogonum nortonii*)	C3c/ /List 1B	O	M	M	L	M	O
Talus Fritillary (*Fritillaria falcata*)	C2/ /List 1B	O	L	M	L	M	O
Fragrant Fritillary (*Fritillaria liliacea*)	C2/ /List 1B	L	L	L	L	L	L
Cone Peak Bedstraw (*Galium californicum* spp. *luciense*)	C2/ /List 1B	O	O	O	O	O	O
Santa Lucia Bedstraw (*Galium clementis*)	C3c/ /List 4	O	O	O	O	O	O
Wedge-Leaved Horkelia (*Horkelia cuneata* ssp. *sericea*)	C2/ /List 1B	O	O	O	O	O	O
Northern California Black Walnut (*Juglans hindsii*)	C2/ /List 1B	O	O	O	O	P*	O
Small-Leaved Lomatium (*Lomatium parvifolium*)	/ /List 4	O	O	O	O	O	O
Abram's Lupine (*Lupinus abramsii*)	/ /List 3	O	L	L	L	L	O
Santa Lucia Lupine (*Lupinus cervinus*)	C3c/ /List 4	O	M-L	M-L	M-L	M-L	O
Abbott's Bush Mallow (*Malacothamnus abbottii*)	C2/ /List 1A	O	O	O	O	O	O
Carmel Valley Bush Mallow (*Malacothamnus palmeri* var. *involucratus*)	C2/ /List 1B	L	L	L	L	L	P
Arroyo Seco Bush Mallow (*Malacothamnus palmeri* var. *lucianus*)	C2/ /List 1B	L	L	L	L	L	O
Carmel Valley Malacothrix (*Malacothrix saxatilis* var. *arachnoidea*)	C2/ /List 1B	O	O	O	P	O	O

TABLE 9-6 (Continued)

Taxa	Status[1]	Site[2] NLP	CAC	SCC	CHU	NSC	CAN
Santa Cruz Microseris (*Microseris decipiens*)	C2/ /List 1B	O	O	O	O	O	O
Curly-Leaved Monardella (*Monardella undulata* var. *undulata*)	/ /List 4	O	O	O	O	O	O
Monterey Pine (*Pinus radiata*)	/ /List 4	O	O	P*	O	P*	P
Valley Oak (*Quercus lobata*)	/ /List 4	P	P	O	P	P	O
Muir's Raillardella (*Raillardella muirii*)	C3c/ /List 1B	O	O	O	O	O	O
Straggly Gooseberry (*Ribes divaricatum* var. *publiflorum*)	/ /List 4	P	P	O	P	O	P
Santa Lucia Gooseberry (*Ribes sericeum*)	/ /List 4	O	O	P	O	O	O

[1]See Table 9-4 for complete list of status definitions.
[2]Sites: NLP = New Los Padres
CAC = Cachagua Creek
SCC = San Clemente Creek
CHU = Chupines Creek
NSC = New San Clemente
CAN = Cañada Reservoir

KEY: O = absent
L = low probability
M = moderate probability
H = high probability
P = known to be present
* = present but not native populations

this impact evaluation, to the level of detail possible; more specific information will be provided in subsequent environmental documentation on the selected preferred alternative. The size and general routes of the proposed pipelines for the pump storage alternatives (San Clemente Creek, Chupines Creek and Cañada Reservoirs) have been identified, and the impact analysis for each of these features is limited to the level of detail provided in the preliminary designs. Other features, such as the proposed dam location, spoils disposal sites, and inundation areas, have been described and located in greater detail, thus allowing for a more specific level of analysis.

STANDARDS OF SIGNIFICANCE

For the purposes of this chapter, potential effects on the following biotic resources were considered:

- locations and/or principal concentrations of rare and/or endangered species;
- the loss of riparian and wetland habitats at the alternative dam sites;
- impacts to the native riparian plant communities in the Carmel River Valley; and
- native upland plant communities and wildlife habitats at the alternative dam sites.

A significant impact to the biotic resources are defined as these impacts that result in a reduction in the population of a State or federally listed endangered or threatened plant or wildlife species, the loss of riparian habitats (a Category 2 Natural Resource as defined by the USFWS) due to inundation, or the loss of riparian habitats due to significant to severe groundwater drawdown in the Carmel Valley aquifer in wet and normal water years.

9.2.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

Impact

9.2.1-1 **The 24,000 AF New Los Padres Dam and Reservoir would inundate and eliminate 177.4 acres of native upland vegetation and wildlife habitat.**

The estimated acreage of each vegetation type that would be inundated by the reservoir is presented in Table 9-7. Prior to construction of the proposed dam and inundation of the reservoir area, "a moderate amount" of oaks, conifers, and brush vegetation within the proposed reservoir

TABLE 9-7

APPROXIMATE ACRES OF VEGETATION TYPE LOSS
DUE TO RESERVOIR INUNDATION
(SURFACE AREAS IN ACRES)

Alternative Site	Vegetation Community	Acres
New Los Padres 24,000 AF	Mixed Hardwood Forest	29.0
(Spillway Elevation 1,120)	Live Oak Forest	62.4
	Valley Oak Woodland	28.1
	Grassland	19.7
	Chamise Chaparral	21.2
	Disturbed Chaparral	13.4
	Coastal Sage Scrub	3.6
	Marsh	2.2
	Open Water (Ex. Res.)	54.7
	Riparian[1]	39.0
	Total	273.3
New Los Padres 16,000 AF	Mixed Hardwood Forest	23.3
(Spillway Elevation 1,090)	Live Oak Forest	46.8
	Valley Oak Woodland	22.4
	Grassland	15.1
	Chamise Chaparral	17.3
	Disturbed Chaparral	13.2
	Coastal Sage Scrub	4.8
	Marsh	2.2
	Open Water (Ex. Res.)	54.7
	Riparian[1]	25.2
	Total	225.0
New Los Padres 9,000 AF	Mixed Hardwood Forest	12.0
(Spillway Elevation 1,050)	Live Oak Forest	27.4
	Valley Oak Woodland	121.4
	Grassland	15.1
	Chamise Chaparral	8.1
	Disturbed Chaparral	2.4
	Coastal Sage Scrub	0.0
	Marsh	2.2
	Open Water (Ex. Res.)	54.7
	Riparian[1]	22.1
	Total	156.4
New San Clemente 23,000 AF	Mixed Hardwood and Live Oak	125.4
(Spillway Elevation 643)	Oak Woodland	39.7
	Grassland	3.5
	Chamise Chaparral	28.8
	Coastal Sage Scrub	21.3
	Riparian[1]	28.8
	River Alluvium	35.1
	Marsh	<0.25
	Existing Reservoir	30.5
	Total	313.1

TOTAL 9-7 (Continued)

Alternative Site	Vegetation Community	Acres
Cachagua Creek 6,000 AF (Spillway Elevation 1,434)	Mixed Hardwood Forest	26.5
	Live Oak Forest	36.0
	Blue Oak Woodland	2.6
	Chamise Chaparral	7.1
	Grassland	3.9
	Riparian[1]	32.8
	Total	108.8
San Clemente Creek 11,000 AF (Spillway Elevation 885)	Mixed Hardwood Forest	48.5
	Live Oak Forest	42.5
	Chamise Chaparral	11.5
	Coastal Sage Scrub	1.1
	Open Water (Pond)	2.1
	Riparian[1]	12.0
	Redwoods	6.6
	Total	124.3
Chupines Creek 10,500 AF (Spillway Elevation 762)	Mixed Hardwood Forest	20.8
	Oak Woodland/Brush Mix	21.0
	Chamise Chaparral	12.2
	Grassland	74.8
	Grassland/Agriculture	17.2
	Riparian[1]	21.4
	Heavily Disturbed	5.2
	Total	172.6
Cañada Reservoir 25,000 AF (Spillway Elevation 1,090)	Monterey Pine Forest	30.9
	Monterey Pine-Coast Live Oak	36.6
	Coast Live Oak Forest	53.1
	Buckeye Woodland	2.4
	Coastal Scrub	97.7
	Coastal Scrub-Coast Live Oak	8.5
	Mixed Chaparral	0.0
	Coastal Prairie	0.0
	Coastal Prairie-Coastal Scrub	0.0
	Riparian Forest	0.0
	Willow Riparian	0.8
	Pond	< 0.1
	Disturbed Grassland	7.8
	Farmland	0.0
	Dwelling	1.3
	Total	239.1

[1] The riparian designation includes combined river alluvium/riparian habitat, and is therefore a maximum estimate.

area would be cleared.[45] Waste materials from the construction of the dam would be deposited on the reservoir floor upstream of the proposed dam. After the dam construction is completed, inundation of the reservoir would eliminate the remaining upland wildlife habitat and vegetation within the reservoir inundation area. This loss of upland habitats and their conversion to aquatic habitats will influence the composition and relative abundance of the wildlife species in the project area. The large reservoir will favor some wildlife populations while adversely affecting others. For example, some waterflow, shorebirds and wading birds would benefit from the large water body.

The dam construction- and operation-related impacts would result in the removal of approximately 177.4 acres of upland vegetation and wildlife habitats. Resident wildlife currently within the reservoir inundation area would move out of the area and onto adjacent lands as the existing habitats are destroyed. Some of these species would be able to populate suitable habitats in the surrounding areas provided that the surrounding areas are not already fully occupied or at carrying capacity.

When the surrounding areas are at or near capacity, competition for food, increased predation and disease would reduce the successful relocation of some species.

It is very difficult to estimate how many of the wildlife species now residing within the reservoir area would be able to survive the loss of this habitat. A safe assumption would be that the surrounding lands are at or near the same population levels as the inundation areas, and any additional competition for food and cover would probably result in some reduction in population levels for the area as a whole. The loss of these upland habitat areas is not expected to jeopardize the continued existence of any single species of wildlife or plant in the region. The U.S. Fish and Wildlife Service rated these upland habitats as "being of lesser value" to wildlife and being more plentiful on a statewide basis (compared to riparian wetlands and instream habitats) and placed these habitats in resource Category 4.[46] For this reason, the impacts associated with the loss of these upland habitats is considered less than significant but would contribute to a cumulative loss of available habitat to those species that utilize these habitats in the region.

Mitigation Measure

9.2.1-1 *Selection of a smaller reservoir alternative at this site would minimize the loss of upland habitats when compared to the 24 NLP alternative. To further minimize*

the loss of upland habitat values, every effort would be made to contain the areas of vegetation clearing and disturbance.

The stated mitigation goal of the USFWS for Resource Category 4 Habitats is to minimize the loss of habitat values. To achieve this mitigation goal, the proposed project should be designed to minimize the area of impact and measures should be implemented during construction to avoid excessive and unnecessary disturbances. Both the 16,000 AF and 9,000 AF reservoir alternatives at this site would result in the loss of less upland habitat than the 24,000 AF alternative. Every effort would be made to contain the area of vegetation clearance and disturbance.

Impact

9.2.1-2 **Project features associated with the construction and operations of the proposed dam and reservoir, including paved access roads, quarry site(s), and fish collection facilities, would result in the removal and degradation of additional native vegetation and wildlife habitat areas outside of the reservoir inundation area.**

Permanent, paved access roads would be constructed to the proposed dam construction sites and to the proposed fish collection facilities. Access to the dam construction site and the downstream fish collection facility would be via an existing 0.8-mile-long road from the intersection of Cachagua Grade Road and the Princes Camp community (see Figure 4-4). Impacts to native vegetation and wildlife associated with the widening and improvement of this existing road are expected to be minimal and insignificant.

A second permanent paved access road would be provided to the dam outlet works discharge structure, the dam crest on the left (west) abutment and past the dam to the upstream fish collection facility. Details of these access roads have not been developed beyond the brief descriptions provided above and the preliminary mapping provided in Figure 4-4. The second of these roads would originate from the Cachagua Grade Road west of Princes Camp and require one crossing of the Carmel River. A detailed evaluation of the construction impacts to the vegetation and wildlife habitats associated with these roads has not been done yet; however, it would appear that some amount of riparian vegetation would be removed due to required work within the Carmel River channel and its tributaries. Additional upland vegetation and wildlife habitat areas would have to be removed all along the access routes.

Preliminary construction material quarry sites have been identified, but accurate estimates of needed volumes and suitable quality would require further testing and sampling. A promising quarry site is located about 3,000 feet upstream of the proposed dam site on the left (west) bank of the Carmel River (see Figure 4-4). The use of this quarry site would not result in the removal of additional native vegetation and wildlife habitats because it would be completely within the inundation area of the 24,000 AF reservoir.

The fish collection facilities are expected to cover approximately 1.93 acres for the downstream site and 3 83 acres for the upstream site. Both of these facilities would impact some additional riparian habitat and upland habitat. Construction-related impacts associated with these facilities are expected to be significant when they involve riparian habitats and thus require some form of mitigation. When the preferred alternative reservoir site has been identified and greater details on the location of access roads and the size of the fish collection facilities have been developed, a detailed evaluation of the impacts associated with these sites will be performed so that a finalized impact evaluation can be conducted. In addition, the downstream fish collector and access roads may impact populations of Lewis' clarkia, Douglas' spineflower, and valley oak.[47] Vegetation that may be affected by this facility include white alder riparian forest and mixed evergreen forest.

Mitigation Measure

9.2.1-2 *Specific mitigation measures for these impacts cannot be identified at this time. In general, road access routes should minimize encroaching riparian zones and the fish collection facility sites requiring the removal and destruction of existing riparian vegetation and wildlife habitat would need to be compensated for by either restoration, creation, or enhancement of riparian habitats elsewhere in the watershed or at the quarry site(s) after completion of project construction.*

Prior to the final approvals of the preferred alternative site, a detailed evaluation of the final access routes, quarry and fish collection sites would need to be conducted. Appropriate mitigation measures to be considered at that time would be avoidance of riparian habitats to the extent possible and compensation for the loss of those riparian habitats that cannot be avoided. Riparian mitigation sites are available downstream at Garland Ranch Regional Park (see Mitigation Measure 9.2.1-3).

Impact

9.2.1-3 **The proposed 24,000 AF New Los Padres dam and reservoir would inundate and eliminate approximately 39 acres of riparian habitat, a habitat type the USFWS has identified as a resource Category 2. This would be considered a significant impact. The agency mitigation goal is no net loss of in-kind habitat values.[48]**

Estimations of the habitat values of the riparian communities that would be lost with this alternative were made by using a simplified USFWS Habitat Evaluation Procedure (HEP).[49] This simplified form of HEP, referred to as a Habitat Assessment (HA), was used in this analysis with the agreement of the MPWMD and the various state and federal resource agencies. A basic component of the HA was the determination of habitat values or Habitat Suitability Index (HSI) for all passerine birds in this case. The HSI values were determined by each member of the HA team consisting of a biologist from the USFWS, the California Department of Fish and Game (CDFG), and the EIR/EIS consultant. The HA team visited representative stretches of the riparian communities at each project site and in the proposed mitigation sites and assigned an HSI value ranging from 1.0 (highest habitat value) to 0.0 (lowest habitat values) based upon their experience and professional opinions. The average of these three values was then applied to each site evaluated. These HSI values were then used to calculate the relative habitat values of each riparian area using the HEP accounting system which simply multiplies the HSI value by the acreage of the habitats evaluated (HSI x Acreage = Habitat Units [HU]). The HEP accounting system defines habitat values in terms of Habitat Units (HUs) per year. For instance, a riparian area of 50 acres with an HSI value of 0.5 would represent 25 HUs/year. A detailed description of the methods used and the data collected to support the findings reported here are presented in Appendix 9-E.

Using the analysis described above and in greater detail in Appendix 9-E, the habitat value of the riparian communities that would be inundated by this alternative was calculated to be about 30.45 HUs per year.

Mitigation Measure

9.2.1-3 *The MPWMD proposes to restore and enhance 50.5 acres of riparian habitat within Garland Ranch Regional Park along the Carmel River.*

The HA methods used to determine the values of the riparian habitat within the inundation area were used to determine that the 50.5 acres of restored riparian habitats would compensate for the loss of the 39 riparian acres in the reservoir inundation area. A detailed description of the mitigation measures is provided in Appendix 9-F (the Draft Riparian Habitat Mitigation Plan). The District has a preliminary agreement with the Monterey Peninsula Regional Park District to implement this mitigation plan. A formal HEP will be conducted on the riparian habitat inundated or affected by the selected project. Based on consultations with resource agencies, the timing of the HEP will be determined (e.g., in Final EIR/EIS or as part of the state or federal permit conditions). Based on the HEP, a final Mitigation Plan will be developed that includes more detailed information on acreage to be restored, planting density, plant species, scope of monitoring, maintenance, etc. Implementation of this riparian habitat restoration project would reduce this loss to a less than significant level.

Impact

9.2.1-4 **The 24,000 AF New Los Padres Reservoir would inundate 2.2 acres of marsh at the upper end of the existing Los Padres Reservoir.**

The existing marsh at the existing Los Padres Reservoir is due to sediment buildup at the upstream end. When sediment-laden river water enters the reservoir, sediment drops out of the water column because water velocity is suddenly reduced. This sediment buildup provides the substrate for emergent wetland vegetation. Because this same phenomenon is expected to occur at the upstream end of the New Los Padres Reservoir, it is reasonable to assume that a new, similar marsh would develop. Thus, the adverse impact on marsh habitat is expected to be less than significant.

Mitigation Measure

9.2.1-4 *Approximately 20 acre-feet of sediment is carried into Los Padres Reservoir each year. The District would implement a five-year monitoring program and performance standard to monitor sediment deposition and emergent vegetation at the upper end of the New Los Padres Reservoir. If monitoring results show that insufficient sediment is being deposited, or that emergent vegetation establishment does not achieve the goals of the monitoring program (i.e., performance standards), the District could take the following actions: (1) design and install a small, temporary check dam to increase sediment capture, and (2)*

plant appropriate species of emergent vegetation similar to those inundated. If these measures are not effective, the District would establish a pond with marsh vegetation at the Garland Ranch site, as described in Appendix 9-F.

<u>Impact</u>

9.2.1-5 **The proposed 24,000 AF New Los Padres dam and reservoir would eliminate populations of two sensitive plants (Lewis' clarkia and valley oak) and displace three populations of sensitive wildlife sensitive species (red-legged frog, foothill yellow-legged frog and yellow warbler).**

The loss of three sensitive wildlife populations is not expected to endanger or threaten the continued existence of these species in the region. Both the red-legged and foothill yellow-legged frogs are listed as species of special concern to the California Department of Fish and Game. The populations of the two sensitive frog species were located in the upper reaches of the existing reservoir and farther upstream in the Danish Creek area. As the proposed reservoir fills up and the inundation zone extends up into the areas where these two native frogs occur, it is possible that the populations of these two frogs would move upstream as the reservoir rises. However, this displacement of the existing populations could expose individuals to predation and exposure. The greater the distance the population has to be displaced, the greater the risk to the continued existence of a viable population. If either or both of these populations were to be eliminated by the inundation of the reservoir, the loss of these populations is not expected to endanger the continued existence of these species in the region.

The yellow warbler is a species of special concern to the CDFG. It was sighted in the riparian habitats of the Carmel River within the reservoir inundation area. Its occurrence within this site suggests that the habitat values of these riparian areas are relatively high. Populations of this bird are believed to be on a decline due to the loss of riparian habitats and its susceptibility to cowbird parasitism. The loss of these riparian habitats would reduce the habitats for this bird at this site, but would not jeopardize the species.

Both the Lewis' clarkia and the valley oak are listed as "watch" species (List 4) by the California Native Plant Society, and those populations within the reservoir inundation area would be eliminated. Although the populations of these two sensitive plant species are rather large and

extensive at this site, both these plants are found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time.

Seven other sensitive wildlife species were judged to have a moderate probability of occurring at this site and thus could be affected by the project. Of these seven sensitive species, two are listed as endangered by both the State and federal government (peregrine falcon and bald eagle) and two are listed as candidates for federal listing (greater western mastiff bat and southwestern pond turtle). The proposed reservoir is not expected to adversely affect any nesting sites for the peregrine falcon or bald eagle, and the enlarged reservoir would actually provide more feeding habitat for both of these raptors.

The southwestern pond turtle may occur in small numbers at this site. If large numbers of this turtle were to occur at this site, it is believed they would have been spotted during the field surveys. Loss of these populations, if any, would not represent a significant threat to the continued existence of this species.

The greater western mastiff bat is known to occur in this region and may well occur in small numbers at this site. The proposed reservoir is not expected to affect any large roosting sites of this species.

In summary, five sensitive plant and animal species, one of which is a candidate for federal listing, could be adversely affected by the proposed project. These impacts are expected to be less than significant. Overall, the impacts of the 24 NLP is considered to be moderate in comparison to the other alternatives.

Mitigation Measure

9.2.1-5 *Although the impacts to these sensitive species are not considered to be significant and thus do not warrant any mitigation measures, the mitigation measures suggested in 9.2.1-1, 9.2.1-3 and 9.2.1-4 would minimize the potential impacts to some of these species.*

Mitigation Measures 9.2.1-1 would minimize the effects on the Lewis' clarkia and the valley oak. Measures 9.2.1-3 and 9.2.1-4 would minimize the effects of this project upon the yellow warbler

and red-legged and yellow-legged frogs, respectively. The proposed riparian restoration efforts at Garland Ranch Regional Park would improve habitat quality for the yellow warbler in this portion of the Carmel River. Wetland habitats are expected to become naturally established at the upper limits of the reservoir inundation zone and may be populated by two sensitive frog species.

Impact

9.2.1-6 **In wet and normal years, there would be beneficial impacts to about 112 acres of riparian vegetation along the lower Carmel River due to river flow and groundwater recharge that would not occur in the existing or No Project situation. In critically dry years, the benefit would increase to about 125 acres. Significant or severe drawdown that would affect about 210 acres would occur only in worst-case conditions similar to the 1987-1990 period. Overall, the 24 NLP would significantly improve downstream conditions and result in a beneficial impact to over 110 acres of riparian habitat in the lower Carmel Valley.**

The method of analysis used to identify downstream riparian impacts for each alternative was defined in a study conducted by Charles McNiesh for the MPWMD using data from the Carmel Valley Simulation Model (CVSIM), a general aquifer drawdown model adapted for the Carmel Valley Aquifer, and well pumping rates in the Carmel Valley.[50] The results of this analysis method were defined in a second report.[51] A summary of the assumptions and theory used in this analysis is provided below to give the reader some understanding of the results. A summary of the results is provided in the discussion of each alternative below. For further details, refer to the reports cited above.

A schematic representation of the Carmel River riparian corridor is presented in Figure 9-8. The analysis considered four different water-year scenarios at a buildout demand of 23,080 AF Cal-Am productions: wet, normal, critically dry, and worst-case water years. Each of these is defined as follows:

- Wet Year - Greater than 87.5 percent of the range of simulated annual inflow in the period 1902-1990.
- Normal Year - Median inflow volume for the period 1902-1990.
- Critically Dry Year - Less than 12.5 percent of the range of simulated annual inflow in the period 1902-1990.

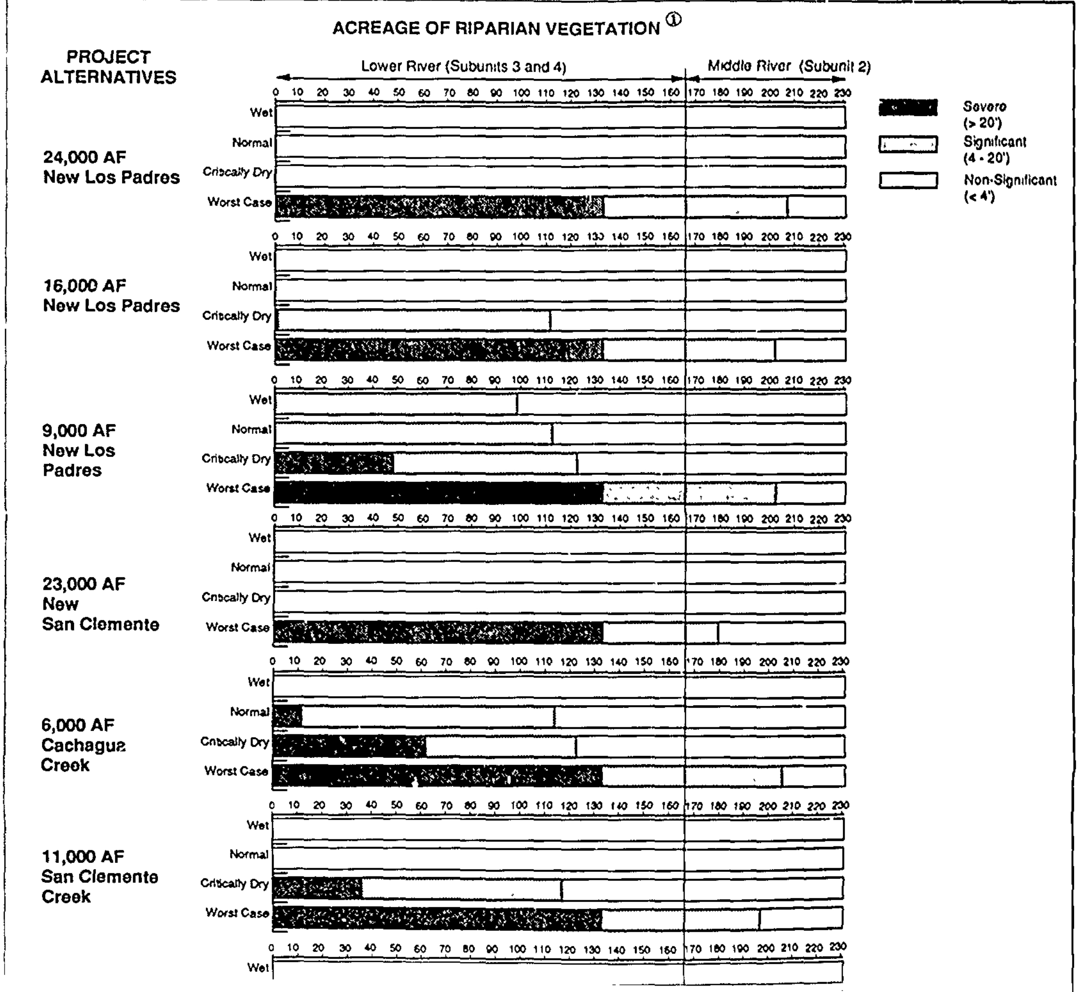
- Worst-Case Year - Conditions under the current extended drought, water years 1987-1990.

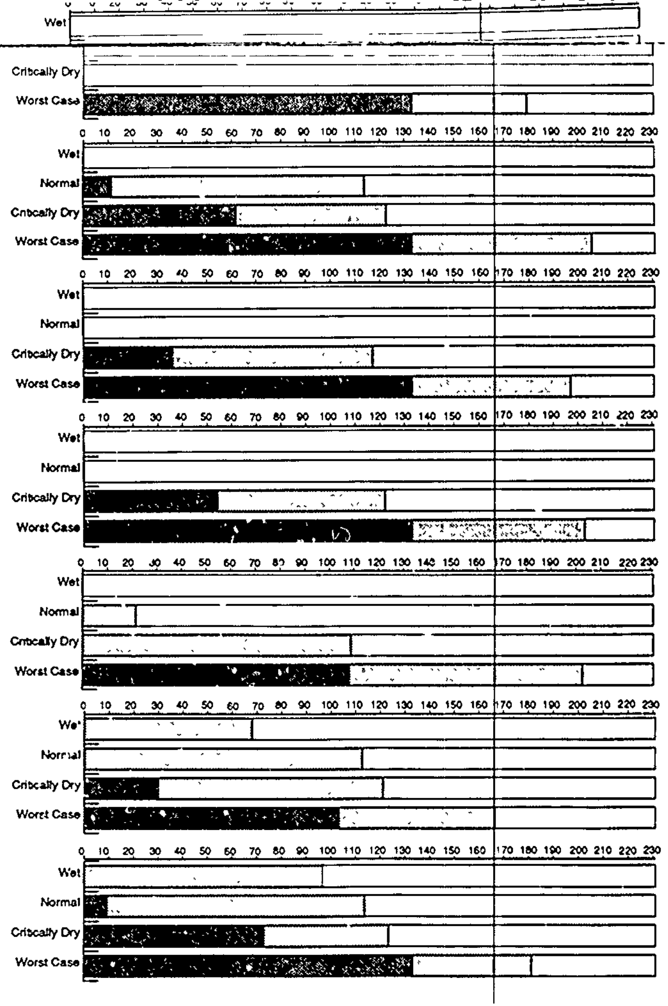
A critical assumption of this evaluation was that seasonal drawdown in the Carmel Valley Aquifer due to groundwater pumping directly impacts the riparian vegetation in the vicinity of the pumps. The study was concerned primarily with those times the Carmel River "dries up," or when a water deficit occurs and there is no surface water flowing down the Carmel River channel. A single impact threshold for groundwater drawdown does not typically exist due to other environmental variables, such as other direct and indirect causes of tree death, environmental factors that exacerbate or mitigate the direct effects of groundwater drawdown, and the rapidity of drawdown. Based on studies by McNiesh a "mild stress" threshold of a 4-foot drawdown during the dry season was used to define significant impacts, and a drawdown of the groundwater table of greater than 20 feet defines a severe impact.[52] A drawdown of less than 4 feet was considered a less than significant impact. The Carmel Valley Aquifer was divided into four subunits, corresponding to the Upper, Middle and Lower River sections defined above as follows: Subunit 1 = Upper River Section, Subunit 2 = Middle River Section, and Subunits 3 and 4 = Lower River Section. A water balance calculation was run on each alternative for each water year and for each subunit of the aquifer. Mapped contours of drawdown levels were then constructed and related to areas of riparian vegetation and lengths of river channel that would be affected. The projected acreages affected by groundwater drawdown for each alternative are shown in Figure 9-9. The Subunit 1 is not discussed as it is not significantly affected by any alternative.

The 24,000 AF reservoir at the New Los Padres site is large enough to provide sufficient storage to maintain year-round flow and recharge the aquifer along the entire river under wet, normal and critically dry conditions. However, during a "worst case" condition, this alternative would not be able to meet the demands without significant effects upon approximately 75 acres of riparian vegetation and severe regional effects on approximately 135 acres of riparian woodland habitats in the lower and middle sections of the Carmel River. This alternative, along with the 23 NSC alternative, would result in the least impacts to the downstream riparian habitats when compared to the other alternatives.

ACREAGES OF RIPARIAN VEGETATION AFFECTED BY GROUNDWATER DRAWDOWN

FIGURE 9-9





① The Lower River has a total of 166.4 acres of riparian vegetation, while the Middle River has a total of 64.5 acres of riparian vegetation, for a total of 230.9 acres.

NOTE Significant or severe drawdown in a wet or normal year is considered a significant impact

SOURCE McNiesh 1991

eip

Mitigation Measures

9.2.1-6 *This alternative is expected to result in beneficial impacts to the riparian habitats downstream of the proposed dam in most water-years, and thus no mitigation measures are needed. In worst case conditions such as the current drought, riparian vegetation can be irrigated with the network of drip tubing that is currently in place.*

9.2.2 16,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (16 NLP/D)

Impact

9.2.2-1 **The 16,000 AF New Los Padres Dam and Reservoir would inundate and eliminate approximately 142.9 acres of native upland vegetation and associated wildlife habitat values.**

The estimated acreage of each vegetation type that would be inundated and eliminated by this proposed reservoir is presented in Table 9-7. The impacts associated with this alternative would be similar to those described for the 24,000 AF alternative (see Impact 9.2.1-1), except that approximately 34.5 acres less upland habitat would be eliminated.

Mitigation Measure

9.2.2-1 *Selection of a smaller reservoir alternative at this site would minimize the loss of upland habitats when compared to the New Los Padres 16,000 AF alternative. To further minimize the loss of upland habitat values, every effort would be made to contain the areas of vegetation clearing and disturbance.*

The mitigation measures for this alternative would be similar to those presented for the 24,000 AF reservoir alternative (see Mitigation Measure 9.2.1-1) except that the resulting loss of upland habitat area would not be as great as with the 24,000 AF alternative.

Impact

9.2.2-2 **Project features associated with the construction and operations of the proposed 16,000 AF New Los Padres Dam and Reservoir, including paved access roads, quarry site(s), and fish collection facilities, would result in the removal and degradation of additional native vegetation and wildlife habitat areas outside of the reservoir inundation area.**

The impacts associated with this alternative are very similar to those identified in Impact 9.2.1-2 above for the 24 NLP alternative.

Mitigation Measure

9.2.2-2 *The mitigation measure for this impact would be identical to Mitigation Measure 9.2.1-2 above.*

Impact

9.2.2-3 **The proposed 16,000 AF New Los Padres dam and reservoir would inundate and eliminate approximately 25 acres of riparian habitat, a habitat type the USFWS has identified as a resource Category 2, or a habitat of high wildlife value.**

Estimations of the habitat values of the riparian communities that would be lost with this alternative were determined with the use of a Habitat Assessment (HA) as described for the 24 NLP alternative. Using the analysis method described in Impact 9.2.1-3 above, the habitat value of the riparian communities that would be inundated by this alternative were estimated to be about 19.8 HUs per year.

Mitigation Measure

9.2.2-3 *The MPWMD proposes to restore and enhance 32.4 acres of riparian habitat within Garland Ranch Regional Park along the Carmel River, as described in Appendix 9-F.*

The HA methods used to assess the habitat values of the riparian area that would be inundated determined that 32.4 acres of restored riparian habitats would compensate for the loss of the 25 riparian acres. A detailed description of the analysis and results are provided in Appendix 9-E.

Impact

9.2.2-4 **The 24,000 AF New Los Padres Reservoir would inundate 2.2 acres of marsh at the upper end of the existing Los Padres Reservoir. Please refer to the discussion under Impact 9.2.1-4.**

Mitigation Measure

9.2.2-4 *The mitigation measures for Impact 9.2.2-4 would be the same as those for Mitigation 9.1.2-4.*

Impact

9.2.2-5 **The proposed 16,000 AF New Los Padres dam and reservoir would eliminate populations of two sensitive plant species (Lewis' clarkia and Valley oak) and displace populations of three sensitive wildlife species (red-legged frog, foothill yellow-legged frog, and the yellow warbler). The loss of these populations are not expected to endanger or threaten the continued existence of these species in the region.**

The impacts to sensitive plant and animal species for this alternative would be similar to those described for the 24,000 AF alternative (Impact 9.2.1-5).

Mitigation Measure

9.2.2-5 *The mitigation measures for this alternative would be identical to those defined for the 24,000 AF alternative above (Mitigation Measure 9.2.1-5).*

Impact

9.2.2-6 **In wet and normal years, the 16 NLP/D alternative would provide beneficial impacts to about 112 acres of riparian vegetation along the lower Carmel River compared to the No Project situation, similar to the 24 NLP alternative. However, in critically dry years, there would be an adverse impact to about 110 acres, but to a lesser degree than with the No Project. Significant or sever drawdown that would affect about 205 acres in worst-case conditions similar to the 1987-1990 period. Overall, the 16 NLP/D would improve downstream conditions and result in a net beneficial impact to over 110 acres of riparian habitat in the lower Carmel Valley, but to a lesser degree than a 24 NLP alternative.**

The 16,000 AF New Los Padres alternative would provide sufficient storage to maintain year-round flows and recharge the groundwater aquifer in wet and normal water years. In critically dry years, significant groundwater drawdown would affect approximately 110 acres of the existing riparian habitat in the lower sections of the river valley. Severe drawdown and associated effects to the riparian habitats would occur in the area around the Rancho Cañada well. Under worst case conditions, approximately 70 acres of the riparian habitats would experience significant

drawdown, and about 135 acres of riparian habitat in the river valley would experience severe drawdown. These aquifer conditions would represent a beneficial impact compared to existing conditions, but would be less beneficial than the larger 24,000 AF alternative (see Figure 9-9).

Mitigation Measure

9.2.2-6 *This alternative is expected to result in beneficial impacts to the riparian habitats downstream of the proposed dam in wet and normal water years. In critically dry and drought years, drawdown and stress upon the riparian habitats would be less than under current conditions. Consequently, this alternative would result in beneficial impacts to the downstream riparian habitats and require no mitigation measures. In critical and worst case conditions, vegetation would be irrigated with drip tubing.*

Impact

9.2.2-7 **Please see impact 9.2.9-2 for potential impacts associated with the construction and siting of the Desalination Plant.**

Mitigation

9.2.2-7 *Please refer to Mitigation Measure 9.2.9-2.*

9.2.3 9,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (9 NLP/D)

Impact

9.2.3-1 **The 9,000 AF New Los Padres Dam and Reservoir would eliminate approximately 77 acres of native upland vegetation and wildlife habitat.**

The estimated acreage of each vegetation type that would be inundated by the reservoir is presented in Table 9-7. The impacts associated with this alternative reservoir are similar to those described for the 24,000 AF alternative (see Impact 9.2.1-1).

Mitigation Measure

9.2.3-1 *The mitigation measures for the 9,000 AF New Los Padres alternative would involve minimizing the area of vegetation clearance and disturbance to the extent possible.*

This alternative is the smallest of the three analyzed at this site and thus represents the least area of disturbance and loss of upland habitats. To further minimize the amount of disturbance to upland habitats, all vegetation clearing and dam construction should be confined to the minimum area necessary.

Impact

9.2.3-2 **The impacts associated with the construction of the proposed dam and associated facilities would be identical to those identified in Impact 9.2.1-2 above.**

Mitigation Measure

9.2.3-2 *The mitigation measures associated with the construction of the proposed dam and associated facilities would be identical to those identified in Mitigation Measure 9.2.1-2 above.*

Impact

9.2.3-3 **Of most significance would be the loss of 22 acres of riparian habitat (versus 39 acres for the 24,000 AF alternative). See the discussion on Impact 9.2.1-3 for more details on this impact.**

Mitigation Measure

9.2.3-3 *The MPWMD proposes to restore and enhance 27.3 acres of riparian habitat within Garland Ranch Regional Park along the Carmel River. See the discussion on Impact 9.2.1-3 and Appendix 9-E for more details on the methods used to determine the amount of mitigation area needed. Appendix 9-F provides details on the proposed riparian habitat mitigation efforts proposed.*

Impact

9.2.3-4 **The loss of the marshland in Los Padres Reservoir would be identical to that described in Impact 9.2.1-4.**

Mitigation Measure

9.2.3-4 *None required. See Mitigation Measure 9.2.1-4.*

Impact

9.2.3-5 **The loss of sensitive plant and wildlife species for the 9 NLP alternative would be identical to that identified and described in Impact 9.2.1-5.**

Mitigation Measure

9.2.3-5 *The mitigation measures for these sensitive species are identical to those suggested in Mitigation Measure 9.2.1-5.*

Impact

9.2.3-6 **This 9 NLP/D alternative would result in "significant or severe" impacts to the riparian habitats in the Lower River Section (Subunits 3 and 4) in all four types of water years. Significant effects upon the riparian habitats would spread upriver to the Middle River Section (Subunit 2) in worst-case scenario.[53] Overall, this alternative would have a significant impact to up to 205 acres of the downstream riparian habitats in the Carmel River Valley.**

This alternative is very similar to the No Project alternative and does not provide the benefits of the 24 NLP and 16 NLP alternatives. Refer to Impact 9.2.1-6 above for a discussion on the methods, assumptions, and data used in this analysis.

This alternative would result in groundwater drawdowns of 4 to 20 feet in wet years in the lower section of the river. This would affect approximately 100 acres of the riparian woodlands in this portion of the river. In normal water years, these impacts would expand to about 110 acres of the riparian woodlands (Figure 9 9). In critically dry water-years these impacts would increase to severe groundwater drawdowns of greater than 20 feet over 50 acres and significant impacts to about 75 acres in this stretch of the Carmel River. In worst-case water years, conditions would be similar to the No Project alternative, resulting in significant or severe groundwater drawdowns affecting about 166 acres in the lower section of the river, and about 35 acres of the riparian woodlands in the middle section of the river.

Mitigation Measure

9.2.3-6 *The adopted mitigation measures of the Water Allocation Program FEIR would reduce the impacts to the riparian resources along the lower portion of the River[54]. It is unknown whether these impacts would be reduced to a less than significant level; thus, the impacts are considered as potentially significant and unavoidable.*

The mitigation measures adopted by the MPWMD Board include the following:

1. Conservation and water distribution management to retain water in the Carmel River.

Elements of this mitigation measure are already in place via an existing comprehensive, long-term conservation program and a Memorandum of Agreement (MOA) with the CDFG and Cal-Am, which calls for a water supply strategy and budget for the system to retain water in the river. In addition, Ordinances Nos. 19 and 41 limit diversions from the San Clemente Dam in order to allow more water to flow downstream. This mitigation measure is expected to affect groundwater levels and river flows in the middle section (Subunit 2) of the River Valley.

2. Prepare and oversee riparian corridor management plan, design projects, obtain access agreements.

The existing Carmel River Management Plan (CRMP) addresses many of the issues to be addressed in the new Riparian Corridor Management Plan (RCMP). The purpose of the RCMP would be to coordinate the many mitigation activities that are required. The RCMP would include the existing erosion control program of the CRMP, identify and prioritize existing riparian vegetation for protection, irrigation, and/or removal to reduce the risk of bank erosion. An additional District staffperson would be hired to write and implement the RCMP.

3. Implement riparian corridor management programs, expand irrigation and planting programs; drill wells.

The RCMP will consolidate and expand the existing MPWMD programs. The principal new activities being proposed initially are to increase the irrigation areas, and to selectively remove vegetation from the channel bottom. It may be necessary for the District to develop its own irrigation wells in the lower section of the River, and establish a nursery for plant materials to be used in the revegetation efforts. Several seasonal staff members will be hired to assist the program manager.

4. Expand the monitoring program for soil moisture and vegetation stress.

This would involve the expansion of the existing soil moisture and vegetation stress monitoring being done by the District. This program would not only involve additional monitoring sites, but it would also include weather monitoring and irrigation scheduling already in place on the River.

Impact

9.2.3-7 **Please see Impact 9.2.9-2 for potential impacts associated with the construction and siting of the Desalination Plant.**

Mitigation Measure

9.2.3-7 *Please refer to Mitigation Measure 9.2.9-2.*

9.2.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

Impact

9.2.4-1 **The 23,000 AF New San Clemente Dam and Reservoir would eliminate approximately 219 acres of native upland vegetation and wildlife habitats.**

The estimated acreage of each upland vegetation type that would be inundated by the reservoir is presented in Table 9-7. The nature of the impacts associated with this alternative would be similar to those described for the New Los Padres site and are defined in greater detail in the discussion on Impact 9.2.1-1 above.

Mitigation Measure

9.2.4-1 *The mitigation measures for the 23,000 AF New San Clemente Dam and Reservoir alternative would be identical to those identified for the 24,000 AF New Los Padres Alternative, except that there is no smaller alternative proposed at this site.*

Impact

9.2.4-2 **Project features associated with the construction and operations of the proposed 23,000 AF New San Clemente dam and reservoir, including paved access roads, quarry site(s), fish collection facilities, and aggregate and concrete processing plants and stockpiles, would require the removal and**

degradation of native vegetation and wildlife habitats outside of the reservoir inundation areas.

Some of the details, including specific locations and sizes of areas, associated with these features have not yet been developed and thus the associated impacts can not be fully defined at this time. Access to the proposed dam construction site would be via an existing road to the downstream toe of the proposed dam site from the intersection of Carmel Valley Road and San Clemente Drive in the Sleepy Hollow Community. A second access road would extend from a bridge crossing the Carmel River at the Sleepy Hollow Flat area and the site of the downstream fish collection facility to the top of the left (west) abutment of the proposed dam. Much of this second road will follow an existing dirt road. Both of these access routes would require the expansion and improvement of portions of the existing roadways. A third permanent, paved access road would be provided to the dam outlet works discharge structure at the base of the proposed dam on the left (west) side of the river. There is no existing access road to this area. A fourth access road would be constructed from the Cachagua Grade Road down to the upstream fish collection facility. Details of these access roads have not been developed beyond the brief description provided above and as depicted in Figures 4-12 and 4-14. Field surveys have not been conducted along these routes. Construction-related impacts to the vegetation and wildlife habitats associated with these access roads cannot be described in detail at this time; however, it would appear that some amount of riparian vegetation would be removed due to required work within the Carmel River channel.

An initial evaluation of the impacts associated with the expansion and improvements of the access route between Carmel Valley Road and the entrance to Cal-Am's property was conducted. This existing road, San Clemente Drive, would be widened from 18 feet to 30 feet to better accommodate trucks. San Clemente Drive passes through an oak savanna of valley oaks (*Quercus lobata*) and California live oaks (*Q. agrifola*) and through a riparian community along Tularcitos Creek. The most significant potential impacts of road widening would be the removal of mature trees within the oak savanna, and vegetation removal and erosion potential at the Tularcitos Creek crossing. Assuming the proposed roadway would follow the center line of the existing roadway with a 6-foot expansion on each side, the direct removal of at least eight mature oak and bay trees would be required (see Table 9-8). Assuming it is possible to expand the roadway from the center

TABLE 9-8

TREES AFFECTED BY WIDENING OF SAN CLEMENTE DRIVE

Trees Within Six Feet of Existing Roadway	Approximate Size of Trees[1]	Opportunities to Avoid by Altering Roadway Alignment[2]
California Live Oak (LO)	3' dbh; 30' tall	+
LO	3' dbh; 35' tall	-
LO	2.5' dbh; 30' tall	-
Bay (B) Split	2' and 1.5' dbh; 35' tall	-
Valley Oak (VO)	2' dbh; 25' tall	+
VO	3' dbh; 25' tall	+
VO	3' dbh; 25' tall	+
LO	4' dbh; 20' tall	+

[1] dbh = Trunk diameter at breast height.
[2] + = Trees may be avoided if roadway alignment can vary from centerline of existing roadway.
 - = Trees cannot be avoided.

line of the existing roadway to avoid the trees, two live oaks and one bay tree would have to be removed. In either of the above cases, there must be some limbing of trees to allow truck traffic flow along the expanded roadway.

There are two areas along the proposed roadway expansion that could result in greater impacts beyond the direct .emoval of trees – the crossing at Tularcitos Creek and the stretch of roadway between Tularcitos Creek and Lismore Lane. Construction work within the riparian zone of Tularcitos Creek could create erosion hazards on site and thus downstream sedimentation problems. This could represent a much more significant impact than the limited removal of riparian vegetation in the area of the existing bridge. Immediately south of the bridge, San Clemente Drive emerges from the creek corridor onto the flat, alluvial terrace supporting the oak savanna. Expansion of this stretch of roadway would likely require the placement of fill on the slope down to the creek corridor and further cutting of the existing cut slope on the opposite side of the roadway. Both activities could damage and eventually destroy a number of additional trees beyond the roadway expansion itself.

Similar evaluations will have to be conducted on the other portions of the access routes should this alternative be selected as the preferred alternative.

Five potential construction material borrow areas have been identified to date, three primary and two secondary (see Figure 4-14). Two of the primary quarry areas would not result in any additional loss of mature vegetation and wildlife habitat because one is located within the existing reservoir while the second would be located within the proposed reservoir. The remaining primary borrow area is located immediately downstream between the proposed dam and the Sleepy Hollow Flat area. It is approximately 18.5 acres and would be centered in the riparian corridor. The removal of this riparian habitat would be significant and require some form of mitigation. Some coastline oak forest would also be removed.

The two secondary borrow areas are located above the proposed reservoir inundation area and would result in the removal of additional upland vegetation and wildlife habitats. The loss of these habitats is not considered significant, however, mitigation efforts would be implemented to minimize the loss of these habitat values.

The final selection of the borrow site(s) would depend upon the amount of overburden needed to be removed, ease of access, cut-slope stability and environmental considerations including the amount and type of vegetation and wildlife habitats that would be affected.

The two fish collection facilities would cover approximately 3.8 acres of the downstream site and 2.9 acres of the upstream site. Both of these facilities would be located within the riparian corridor and the Carmel River and thus result in a significant impact requiring mitigation.

Sensitive plant surveys conducted in June, 1991 in the quarry sites and the proposed fish collection facilities did not locate any of the species of concern. However, suitable habitat for Lewis' clarkia and Douglas' spine flower is present. Vegetation that could be removed by this facility include non-native grassland, coast live oak forest, white alder riparian forest, and central coast cottonwood-sycamore riparian forest.

All tree and brush vegetation within the bottom of the proposed reservoir area would be cleared prior to construction of the proposed dam and inundation of the reservoir area. Waste materials from dam construction would be deposited on the reservoir floor upstream of the proposed dam, creating a flat area where the aggregate processing plant, stockpiles, and concrete production plant would be located. These activities and construction facilities would not result in any additional significant impacts.

Mitigation Measure

9.2.4-2 *Specific mitigation measures for many of these impacts cannot be identified at this time. In general, road access routes should minimize the removal of mature trees and crossings of the Carmel River; borrow areas outside the inundation area should be revegetated and restored; disturbed riparian habitats should be compensated; and erosion control measures should be implemented.*

Prior to the final approvals of the preferred alternative site, a detailed evaluation of the final access routes (similar to those presented for that portion of the access route within the Sleepy Hollow Subdivision) and the fish collection sites will be conducted. Assessments and Final Mitigation Plans will be developed in consultation with State and federal resource agencies.

In selecting the appropriate borrow site(s), the least detrimental sites would be those sites within the existing or proposed reservoir sites and the two secondary sites. The primary site located immediately downstream of the proposed dam site is the least preferred in terms of impacts to biotic resources.

The most appropriate mitigation measure to be considered for disturbances of riparian habitats would be avoidance whenever possible. Compensation for the loss of those riparian habitats that cannot be avoided could include downstream sites at Garland Ranch Regional Park (see Mitigation Measure 9.2.1-3) or restoration of the impact site (quarry site) after completion of project construction.

Impact

9.2.4-3 **The proposed reservoir would inundate and eliminate approximately 64 acres of riparian habitat, a habitat type of greater value and significance than other terrestrial habitats in the reservoir area. See Impact 9.2.1-3 for more details on this impact.**

Mitigation Measure

9.2.4-3 *The MPWMD proposes to restore and enhance 112 acres of riparian habitat within Garland Ranch Regional Park along the Carmel River. See Impact 9.2.1-3 and Appendices 9-E and 9-F for more details on the methods used in determining the amount of mitigation area needed and details on the proposed riparian habitat enhancement and restoration efforts proposed*

Impact

9.2.4-4 **The New San Clemente Reservoir would inundate approximately 0.25 acres of marsh vegetation.**

A small area of marsh vegetation occurs on the west side of the existing reservoir. This vegetation would be lost with construction of the new dam. This would be considered less than significant.

Mitigation Measure

9.2.4-4 *Please refer to mitigation measure 9.2.1-4.*

Conditions similar to those for the New Los Padres reservoir would occur at the New San Clemente site and the mitigation measures would be the same.

Impact

9.2.4-5 **Populations of four sensitive plant species (Lewis' clarkia, Northern California black walnut, Monterey pine, and valley oak) and five sensitive wildlife species (American peregrine falcon, red-legged frog, yellow warbler, sharp-skinned hawk and Southwestern pond turtle) have been located within the proposed reservoir inundation area. The populations of all the plant species would be eliminated with the construction of the proposed dam and inundation of the reservoir. The loss of these populations is not expected to endanger or threaten the continued existence of these species in the region. The populations of the American peregrine falcon, sharp-shinned hawk and the Southwestern pond turtle are not expected to be significantly affected by the proposed dam and reservoir. The populations of the red-legged frog and yellow warbler could be adversely affected by the reservoir inundation.**

The potential impacts to the existing population of red-legged frog, yellow warbler, Southwestern pond turtle and peregrine falcon are similar to those described under Impact 9.2.1-5.

Breeding populations of the sharp-shinned hawk are on the decline in California. However, the wintering populations of this bird seem to have stabilized in the past few years. The bird observed at the reservoir site is believed to have been a winter migrant, and no nesting sites were observed. Suitable nesting sites for this bird, which prefers tall conifers, are very limited on this site.

It is possible that the proposed reservoir would inundate and destroy undiscovered populations of the Carmel Valley bush-mallow, Pinnacles buckwheat, Talus fritillary, and Santa Lucia lupine. Suitable habitat for each of these species occurs in the inundation zone. However, it is suspected that any populations of these sensitive plants that may occur in the area would be small given the fact that the plant was not discovered during the field surveys conducted to date.

Six sensitive wildlife species were judged to have a moderate to high probability of occurring in the project area. Of these, the most sensitive are the greater western mastiff bat and the bald eagle. The impacts to these species are similar to those described in Impact 9.2.1-5.

In summary, this alternative would impact the largest number of sensitive plant and animal species. Two of these sensitive species are candidates for federal listing (red-legged frog and the southwestern pond turtle) and one is listed as endangered (peregrine falcon).

Mitigation Measure

9.2.4-5 *See Mitigation Measure 9.2.1-5.*

Impact

9.2.4-6 **The beneficial impacts of the 23 NSC alternative would be identical to those described for the 24 NLP alternative in wet, normal and critically dry years (see Impact 9.2.1-6). In the worst case conditions, significant or sever drawdown would affect about 180 acres.[55] Overall, the 23 NSC would result in a beneficial impact to over 110 acres of riparian woodland along the Lower Carmel River.**

Refer to Impact 9.2.1-6 for a discussion of the methods, assumptions, and data used in this analysis.

The 23,000 AF reservoir at the New San Clemente site is large enough to provide sufficient storage to maintain year-round flow and recharge the aquifer along the entire river under wet, normal and critically dry conditions. However, during a worst-case condition this alternative would not be able to meet the demands without significant effects to approximately 45 acres of riparian vegetation and severe regional effects to approximately 135 acres of riparian woodland habitats in the middle and lower sections of the Carmel River. This alternative has similar impacts to the 24,000 AF New Los Padres alternative except that it would enable greater summer flow rates in Subunit 2, thus resulting in less severe impacts to the riparian woodlands (see Figure 9-9).

Mitigation Measures

9.2.4-6 *This alternative is expected to result in beneficial impacts to the riparian habitats downstream of the proposed dam in nearly all water years, and thus no mitigation measures are needed. In the worst case condition, vegetation would be irrigated with drip tubing.*

9.2.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

Impact

9.2.5-1 **The 6,000 AF Cachagua Creek Dam and Reservoir would eliminate approximately 76 acres of native upland vegetation and wildlife habitats.**

The estimated acreage of each vegetation type that would be inundated by the reservoir is presented in Table 9-7. The nature of this impact is identical to that described in Impact 9.2.1.1.

Mitigation Measure

9.2.5-1 *The mitigation measures for the 6,000 AF Cachagua Creek alternative would be identical to those identified for the 24,000 AF New Los Padres alternative (see Mitigation Measure 9.2.1-1), except that there is no smaller alternative reservoir proposed for this site.*

Impact

9.2.5-2 **Project features associated with the construction and operations of the proposed dam and reservoir, including paved access roads, existing roadway relocation, quarry site(s), aggregate and concrete processing plants and stockpiles, would result in the removal and degradation of additional native vegetation and wildlife habitats outside of the dam and reservoir inundation areas.**

The existing public roadways along Cachagua Creek to the Cachagua Grade (Cachagua Road) and along James Creek (Jamesburg Road) would be relocated. These relocated roadways are shown in Figure 4-17. Approximately 2.8 miles of Cachagua Road would be relocated from one mile downstream of the proposed dam, where it would cross Cachagua Creek on a bridge and then continue along the north side of the reservoir to the Carmel Valley Road at the Cachagua Grade. Access to the crest of the proposed dam and materials stockpile and construction sites would be via this relocated stretch of Cachagua Road. Access to the outlet works of the proposed dam would be along the existing Cachagua Road. The Jamesburg Road relocation would be approximately 2.3 miles in length and would begin about 1.5 miles downstream of the proposed dam and continue south of the reservoir and eventually tie into the existing Jamesburg roadway upstream of the reservoir. Impacts to native vegetation and wildlife associated with the construction and use of these relocated roadways are unknown at this time due to the fact the

private landowners these routes would pass through did not give permission for the biologist to conduct the required field surveys. If this alternative were to be selected as the preferred alternative, additional biotic surveys and studies would be needed in these areas to adequately define the impacts of these project features.

Two preliminary construction material quarry sites have been identified.[56] A site that would provide an adequate amount of suitable impervious dam core materials has been identified on the alluvial terraces in the Princes Camp area. The use of this quarry site (see Figure 4-9) would result in the removal of riparian vegetation and wildlife habitats. These impacts would be significant and thus require some form of mitigation for the habitat and vegetation losses and disturbances associated with the quarry activities. The second borrow site is located about one-half mile upstream of the proposed dam, where rock material for the dam embankment would be quarried (see Figure 4-17) of which approximately 14.7 acres are located outside of the proposed reservoir inundation area. This southwest-facing slope supports live oak forest and chamise chaparral vegetation. A detailed biotic evaluation of these sites was not conducted because, once again, the private property owners would not allow access to the sites. The potential impacts to these sites will need to be determined in the future should this alternative be selected as the preferred alternative.

Mitigation Measure

9.2.5-2 *Specific mitigation measures for these impacts cannot be identified at this time. In general, road access routes should minimize crossings of creeks, and quarry sites requiring the removal and destruction of existing riparian vegetation and wildlife habitat will need to be compensated for by either restoration, creation, or enhancement of riparian habitats elsewhere or at the quarry site after completion of project construction.*

Prior to the final approvals of the preferred alternative site, a detailed evaluation of the final access routes and quarry sites would be conducted. Appropriate mitigation measures to be considered at that time would be avoidance of riparian habitats to the extent possible and compensation for the loss of those riparian habitats that cannot be avoided. Potential riparian compensation sites include downstream sites at Garland Ranch Regional Park (see Mitigation Measure 9.2.1-3) or restoration of the quarry sites after completion of project construction.

Impact

9.2.5-3 **The proposed reservoir would inundate and eliminate approximately 33 acres of riparian habitat, a habitat type of greater value and significance when compared to the other terrestrial habitats in the reservoir area. See Impact 9.2.1-3 for more details on this impact.**

Mitigation Measure

9.2.5-3 *The MPWMD proposes to restore and enhance 33 acres of riparian habitat within Garland Ranch Regional Park along the Carmel River. See Mitigation Measure 9.2.1-3 and Appendices 9-E and 9-F for more details on the methods used to determine the mitigation area needed and details on the proposed riparian habitat enhancement and restoration efforts proposed.*

Impact

9.2.5-4 **Populations of three sensitive plant species (Lewis' clarkia, straggly gooseberry and valley oak) have been located within the proposed reservoir inundation area. The populations of these species would be eliminated with the construction of the proposed dam and inundation of the reservoir.**

The loss of these populations is not expected to endanger or threaten the continued existence of these species in the region There is a high probability that the Southwestern pond turtle may occur in the ponds along the creeks on this site. There is a moderate possibility of two sensitive plant species and five sensitive wildlife species occurring in this site; however, populations of these species are expected to be so low that the elimination would not be expected to significantly threaten the continued existence of the species. Seven additional sensitive plant and wildlife species have low probabilities of occurring in the reservoir area. Any populations of these species are expected to be very low and if eliminated pose no significant threat to the continued existence of the species in the region. The impacts to sensitive plant and animal species are expected to be relatively minor and, in fact, the least of all to the alternatives.

Mitigation Measure

9.2.5-4 *The impacts to these sensitive species are not considered to be significant enough to warrant any mitigation measures.*

Impact

9.2.5-5 **In wet years, the 6 CAC/D would provide a beneficial impact to about 100 acres of riparian woodlands. However, significant and severe impacts to 115-105 acres of riparian woodland would occur in normal, critically dry and worst case conditions.[57] Overall, the 6 CAC/D would result in significant impacts to riparian habitat along the lower Carmel River.**

See Impact 9.2.1-6 for a discussion on the methods, assumptions, and data used in this analysis.

The required pumping to meet the projected demands would still generate significant to severe drawdown effects in the lower section of the river in normal and critically dry years, and these impacts would extend up into the middle section of the river in worst-case water-years (Figure 9-8). The impacts associated with this alternative would be very similar to those of the 9,000 AF New Los Padres alternative (Impact 9.2.3-6) except that impacts would not be significant in wet years.

Mitigation Measure

9.2.5-5 *See Mitigation Measure 9.2.3-6 for the 9 NLP/D alternative. Impacts to riparian woodland would be considered potentially significant and unavoidable.*

Impact

9.2.5-6 **Please see Impact 9.2.9-2 for potential impacts associated with the construction and siting of the Desalination Plant.**

Mitigation Measure

9.2.5-6 *Please refer to Mitigation Measure 9.2.9-2.*

9.2.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

Impact

9.2.6-1 **The 11,000 AF San Clemente Creek Dam and Reservoir would eliminate approximately 110 acres of native upland vegetation and wildlife habitats.**

The estimated acreage of each vegetation type that would be inundated by the reservoir is presented in Table 9-7. The nature of this impact is identical to that described in Impact 9.2.1-1.

Mitigation Measure

9.2.6-1 *The mitigation measures for the 11,000 AF San Clemente Creek alternative would be identical to those identified for the 24,000 AF New Los Padres alternative (see Mitigation Measure 9.2.1-1), except no smaller alternative reservoir is proposed for this site.*

Impact

9.2.6-2 **Project features associated with the construction and operation of the proposed dam and reservoir, including paved access roads, quarry site(s), aggregate and concrete processing plants and stockpiles, and the pump storage pipeline and plant, would result in the removal and degradation of native vegetation and wildlife habitats outside of the dam and reservoir areas.**

Many of the details, including specific locations and sizes of areas, associated with these features have not yet been developed, and thus the associated impacts cannot be fully defined at this time. Two alternative access routes to the proposed dam and construction sites were addressed in the Preliminary Design Report.[58] The preferred route identified in this report would be via the existing road from the Carmel Valley Road to the San Clemente Dam and then via an existing fire trail around the westerly side of the San Clemente Creek Canyon (see Figure 4-21). This access route would provide access not only to the proposed dam but also to the outlet works discharge structure, pumping plant, and the pump storage pipeline as well. Use of this route would require improvements to about three miles of the existing roadway between the Cal-Am filter plant on the Carmel River (Sleepy Hollow) to the proposed dam site. Impacts to native vegetation and wildlife associated with the use of the section of this roadway between Carmel Valley Road and the proposed New San Clemente Dam site are discussed in Impact 9.2.4-1. Impacts associated with the widening and paving of the remainder of this access road to the proposed dam site would involve the removal of additional terrestrial vegetation and wildlife habitat areas

The second alternative access route would follow an existing road from Robinson Canyon Road west to the project site and run through the San Clemente Rancho private development to the dam site. Improvements to this access route may also be needed.

A spur road to the dam crest on the left abutment is proposed; however, details of this road have not been developed at this time. Construction impacts to the vegetation and wildlife habitats associated with these access roads can not be described in detail at this time, however, it is assumed that some amount of native vegetation and wildlife habitat would be removed.

Preliminary construction material quarry sites have been identified, but accurate estimates of needed volumes and suitable quality require further testing and sampling. The sand, silt and gravel needed for the concrete mix are expected to be available via the excavation site of the dam foundation, and in the unconsolidated alluvium behind the existing San Clemente Dam. Impacts to terrestrial vegetation and wildlife habitats in these borrow areas are described in Impact 9.2.5-1 above. Additional needed granitic material would be quarried from a prominent granitic rock knob and within the reservoir inundation area located upstream of the proposed dam. Approximately 17 acres of this is covered with mixed hardwood forest and stands of redwood trees. This potential quarry site is located outside of the reservoir inundation area. A detailed evaluation of the potential impacts of this site has not been completed and will need to be performed prior to final approval of this alternative, should it be selected as the preferred alternative.

The aggregate processing and concrete production sites would be located on the right (south) side of the canyon downstream of the dam. The spoils disposal area would be located on the left (north) side of the canyon also downstream of the dam. The exact location of these construction sites must be determined before an adequate impact evaluation can be completed.

The pumping plant would be located on the banks of the existing San Clemente Reservoir in an area that now supports oak woodlands. The removal of vegetation for this facility is not expected to be significant. The pump storage pipeline would be located within the area that would be inundated by the New San Clemente Reservoir alternative, and thus impacts associated with this area are addressed in Section 9.2.4 above. This pipeline would not result in any significant adverse impacts.

Mitigation Measure

9.2.6-2 *Specific mitigation measures for these impacts cannot be identified at this time. In general, road access routes should minimize crossings of the Carmel River and San Clemente Creek, and the quarry site requiring the removal and destruction*

of existing vegetation and wildlife habitat would need to be evaluated and, if necessary, compensated for either by restoration, creation, or enhancement of similar habitats elsewhere or at the quarry site after completion of project construction.

The construction of the needed access roads, borrow site and associated pumping facilities is not expected to result in any significant loss of riparian habitats but would result in the loss of other upland habitat types. The specific mitigation measures designed to minimize these impacts would be developed when specific information on the location and size of these facilities has been generated and if this alternative were to be selected as the preferred alternative.

Impact

9.2.6-3 **The proposed reservoir would inundate and eliminate approximately 12 acres of riparian habitat, a habitat type of greater value and significance than the other terrestrial habitats in the reservoir area. See Impact 9.2.1-3 for more details on this impact.**

Mitigation Measure

9.2.6-3 *The MPWMD proposes to restore and enhance 18 acres of riparian habitat within Garland Ranch Regional Park along the Carmel River. See Mitigation Measure 9.2.1-3 and Appendices 9-E and 9-F for more details on the methods used in determining the amount of mitigation area needed and details on the proposed riparian habitat enhancement and restoration efforts proposed.*

Impact

9.2.6-4 **Populations of four sensitive plant species (Lewis' clarkia, Douglas' spineflower, Monterey pine, and Santa Lucia gooseberry) and three sensitive wildlife species (red-legged frog, coast horned lizard and Cooper's hawk) have been located within the proposed reservoir inundation area. The populations of all these species would be eliminated or adversely affected with the construction of the proposed dam and inundation of the reservoir. The loss of these populations is not expected to endanger or threaten the continued existence of these species in the region.**

This alternative would adversely affect at least seven sensitive plant and animal species known to be present on the site, the most sensitive being the red-legged frog.

In addition to the species known on the site, there is a high to moderate possibility that as many as seven additional sensitive animal species and three additional plant species could occur there. Of these, there is a high probability that the southwestern pond turtle occurs on the fishing pond at the upper end of the proposed reservoir. There is also a moderate probability that the spotted owl may nest in the woodland located on the site, and the destruction of nesting sites would be considered a significant impact. A formal night survey would be conducted if this alternative is selected as the preferred project.

The remaining sensitive species have a moderate probability of occurring on the site but their populations would be expected to be low and their elimination would not be expected to significantly threaten the continued existence of these species. There are also several sensitive species with a low possibility of occurring on the site. These populations would probably be very small and their loss would not threaten the existence of these species.

In general, the San Clemente Creek site contains a number of sensitive plant and animal species with high to moderate possibility of some very sensitive federally listed species.

Mitigation Measure

9.2.6-4 *Mitigation Measures 9.2.1-1 and 9.2.1-3 would minimize the effects of this project upon the red-legged frog and Cooper's hawk. Wetland habitats may be established naturally at the upper limits of the reservoir inundation zone and may be populated by the sensitive frog species. The proposed riparian restoration efforts at Garland Ranch Regional Park would improve habitat quality for the Cooper's hawk in this portion of the Carmel River.*

There are no suitable mitigation measures other than avoidance for potential impacts to the spotted owl. A field survey for this sensitive species should be conducted to make a final determination of the presence or absence of this owl at this site. If it is found at the site and would be adversely affected by the project, the only suitable mitigation measure would be the selection of an alternative site or a statement of overriding considerations.

Impact

9.2.6-5 **The beneficial impacts of the 11 SCC alternative in normal and wet years would be very similar to those described for the 16 NLP/D (Impact 9.2.2-6). There would be significant or sever impacts to 115 and 195 acres of riparian woodland in critically dry and worst case conditions, respectively.[59] Overall,**

the 11 SCC would result in a beneficial impact to about 110 acres of riparian woodland along the lower Carmel River.

Under this alternative the required pumping to meet the demands were moderate resulting in impacts that are intermediate when compared to the other alternatives. In critically dry water-years, 116 acres of riparian woodlands in the lower river section, would experience significant to severe drawdowns and associated stresses. In the worst-case scenario, these impacts would extend up the river valley into the middle section of the river and affect approximately 31 acres of the riparian woodlands in this section of the river in addition to 166 acres in the lower section (see Figure 9-9).

Mitigation Measure

9.2.6-5 *This alternative is expected to result in beneficial impacts to the riparian habitats downstream of the proposed dam in wet and normal water years and no mitigation measures are needed. In critically dry or worst-case years, riparian vegetation would be irrigated.*

9.2.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

Impact

9.2.7-1 **The 10,500 AF Chupines Creek Dam and Reservoir would eliminate approximately 151 acres of native upland vegetation and wildlife habitats.**

The estimated acreage of each vegetation type that would be inundated by the reservoir is presented in Table 9-7. The nature of this impact is identical to that described in Impact 9.2.1-1.

Mitigation Measure

9.2.7-1 *The mitigation measures for the 10,500 AF Chupines Creek alternative would be identical to those identified for the 24,000 AF New Los Padres alternative (see Mitigation Measure 9.2.1-1), except that there is no smaller alternative reservoir proposed for this site.*

Impact

9.2.7-2 **Project features associated with the construction and operations of the proposed dam and reservoir, including paved access roads, quarry site(s),**

aggregate and concrete processing plants and stockpiles, and the pump storage pipeline and plant will result in the removal and degradation of native vegetation and wildlife habitats outside of the dam and reservoir areas.

Access to the proposed dam site would be via an existing dirt road from Carmel Valley Road (see Figure 4-26). It may be necessary to widen and improve this road, thus disturbing adjacent vegetation and wildlife habitats. These disturbances would only be considered significant if the construction activities were to encroach upon Chupines Creek, which runs immediately south of the existing roadway.

Four potential quarry sites for this alternative have been identified to date: two upstream and one immediately downstream of the dam and reservoir site, and a fourth within the reservoir inundation area (see Figure 4-26). Two of the three potential borrow sites occupy approximately 69.3 acres within grassland habitats, while the third occupies approximately 26.5 acres in a Mixed Hardwood Forest. The loss of these vegetation types and wildlife habitats is not considered to be significant in and of itself, but rather represents a cumulative loss of natural upland habitats in the project area. Vegetation on these quarry sites includes non-native grassland, coast live oak woodland, valley oak woodland, coastal scrub, and cottonwood-sycamore riparian forest. The acreage of each community type needs to be determined. Valley oak occurs on all but the northwest, upstream site and Lewis' clarkia occurs in large numbers on the downstream site.[60] Both of these species are CNPS List 4 plants.

Construction of the proposed pumping plant and pipeline would result in the removal of additional native vegetation and wildlife habitats at the pumping plant site and along the pipeline route. These facilities would be located within the Chupines and Tularcitos Creeks and Carmel River corridors (see Figure 4-26). The pumping plant is expected to occupy less than an acre in area and would thus result in very little disturbance to the riparian habitat at this site. The 54-inch-diameter pipe would require the disturbance of a much larger amount of riparian habitats and would be considered a significant impact requiring some form of compensation or mitigation

At this time, the aggregate and concrete processing plants and construction storage and spoils areas have not been defined. If they are located within the reservoir inundation area, there would be no additional disturbances to native vegetation and wildlife habitats However, if they are

located outside of the reservoir inundation zone and in areas not to be otherwise disturbed, this would result in additional losses of vegetation and wildlife areas.

Mitigation Measure

9.2.7-2 *Specific mitigation measures for these impacts cannot be identified at this time. In general, road access improvements should avoid encroaching into the riparian zone along Chupines Creek and the pipeline route requiring the removal and destruction of existing riparian vegetation and wildlife habitat will need to be compensated for either by restoration, creation, or enhancement of riparian habitats elsewhere or along the pipeline route after completion of project construction.*

Improvements to the existing dirt road for construction access should avoid encroaching into the riparian zone whenever possible. With proper design, there should be no reason this access route would encroach into the riparian zone along Chupines Creek.

Although the loss of the upland habitats at the proposed borrow sites outside of the proposed reservoir inundation zone are not considered significant impacts in and of themselves, these sites should be revegetated to minimize the cumulative loss of these habitats

Prior to the final approvals of the preferred alternative site, a detailed evaluation of the final pipeline route, and quarry sites will have to be conducted. Appropriate mitigation measures to be considered at that time would be avoidance of riparian habitats to the extent possible and compensation for the loss of those riparian habitats that cannot be avoided. Potential riparian compensation sites include downstream sites at Garland Ranch Regional Park (see Mitigation Measure 9.2.1-3), or restoration of the riparian habitats all along the pipeline route after completion of project construction.

Impact

9.2.7-3 **The proposed reservoir would inundate and eliminate approximately 21 acres of riparian habitat, a habitat type of greater value and significance than the other terrestrial habitats in the reservoir area.**

See Impact 9.2.1-3 for more details on this impact.

Mitigation Measure

9.2.7-3 *The MPWMD proposes to restore and enhance 21 acres of riparian habitat within Garland Ranch Regional Park along the Carmel River. See Mitigation Measure 9.2.1-3 and Appendices 9-E and 9-F for more details on the methods used in determining the amount of mitigation area needed and the proposed riparian habitat enhancement and restoration efforts proposed.*

Impact

9.2.7-4 **Populations of two sensitive plant species (Carmel Valley malacothrix, and valley oak) have been located within the proposed reservoir inundation area. The populations of these two species would be eliminated with the construction of the proposed dam and inundation of the reservoir. The loss of the Valley Oak population is not expected to endanger or threaten the continued existence of this species in the region. The loss of the three populations of the Carmel Valley malacothrix would represent a significant impact in that one of these populations occurs in a natural setting unlike many of the other known populations of this plant.**

The yellow warbler was observed at this site and would be adversely affected by the proposed project.

The populations of the Carmel Valley malacothrix would be destroyed by the proposed project. This plant is typically found on disturbed sites, but one of the populations at this site is undisturbed. This natural characteristic of this population make it somewhat unique and worthy of preservation. The loss of this population would be significant.

This alternative would have the most significant impacts to known populations of sensitive species when compared to the other alternatives.

There is a moderate possibility of one sensitive plant species and five sensitive wildlife species occurring in this site, however, populations of these species are expected to be so low that their elimination would not be expected to significantly threaten the continued existence of the species

Twelve additional sensitive plant and wildlife species have low probabilities of occurring in the reservoir area. Any populations of these species are expected to be very low and if eliminated pose no significant threat to the continued existence of the species in the region.

This alternative would have the most significant impacts to known populations of sensitive species when compared to the other alternatives.

Mitigation Measure

9.2.7-4 *There is no way this project can avoid destroying the three populations of the Carmel Valley malacothrix if built as proposed. Attempts to transplant these populations to some other site would not be considered an appropriate mitigation measure even if such were successful. This proposed project would thus result in an unavoidable significant adverse impact. Any impacts to the other sensitive species that may occur in this site are not expected to be significant due to the fact that any populations would be small and thus of limited impact to the continued existence of that species in the region.*

Impact

9.2.7-5 **This alternative would have similar impacts on the downstream riparian habitats to the San Clemente Creek alternative (see Impact 9.2.6-5). This project alternative would improve the downstream conditions compared to the current conditions in normal and wet years. However, in critically dry years this alternative would result in significant to severe drawdowns over a greater area of the Lower River Section and thus affect slightly more riparian woodland habitats (122 acres) than the San Clemente Creek alternative (116 acres). In the worst-case scenario, this alternative would result in significant to severe drawdowns over a slightly larger area in the middle section of the river and thus slightly more riparian woodlands would be effected in this portion of the river.[61] Overall, this alternative would result in beneficial impacts to the downstream riparian habitats in the Carmel River Valley.**

Under this alternative the required pumping to meet the demands were moderate resulting in impacts that are intermediate when compared to the largest mainstream reservoir alternatives, but beneficial when compared to existing conditions (see Figure 9-9).

Mitigation Measure

9.2.7-5 *This alternative is expected to result in beneficial impacts to the riparian habitats downstream of the proposed dam in wet and normal water years and no mitigation measures are needed. In critically dry or worst-case years, riparian vegetation would be irrigated.*

9.2.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

Impact

9.2.8-1 **The 25,000 AF Cañada Dam and Reservoir would inundate and eliminate approximately 229 acres of native upland vegetation and associated wildlife habitat values.**

The proposed reservoir would inundate approximately 229 acres of native vegetation and wildlife habitats. The loss of these native vegetation communities at this site was not considered significant in the context of the overall distribution of these habitats in the project region. Even the loss of approximately 31 acres of the Monterey pine forest, a botanical community considered rare and declining by the California Natural Diversity Data Base, was not considered significant.[62]

The greatest loss of wildlife resources would occur in the approximately 120 acres of mature coastal oak woodland and closed-cone pine-cypress habitats in the inundation area.[63] The direct loss of these wildlife habitats is expected to result in the direct loss of those individuals of approximately 170 wildlife species now occupying the project site. It would also represent a cumulative loss of these habitat types in the Carmel Valley.

Mitigation Measure

9.2.8-1 *To minimize the loss of upland habitat values, every effort would be made to contain the areas of vegetation clearing and disturbance.*

The mitigation measures for this alternative would be similar to those presented for the 24,000 AF New Los Padres alternative (see Mitigation Measure 9.2.1-1) even though this alternative would result in a greater loss of upland habitat areas and differing habitat types.

Impact

9.2.8-2 **Project features associated with the construction and operations of the proposed 25,000 AF Cañada dam and reservoir, including paved access roads, quarry site(s), intake facility and pump station, transmission pipeline, water treatment plant, aggregate and concrete processing plants, and spoils and equipment laydown areas would result in the removal and degradation of additional native vegetation and wildlife habitat areas outside of the reservoir inundation area.**

The identification of proposed access roads, borrow site(s), and construction areas and facilities has not been completed for this alternative. Consequently, the extent of habitat removal and disturbances cannot be determined at this time.

The proposed water intake and pump station would be located on the Carmel River and cover an area of approximately one-half acre. The existing riparian forest vegetation located on the north banks of the river in this area would be eliminated and replaced by the intake structure and pump house.

The proposed transmission pipeline would pass through farmlands, coastal live oak, buckeye woodland, coastal scrub and disturbed grassland habitats. Construction of this pipeline would disturb portions of these habitats all along the proposed route.

The proposed water treatment plant would be located at the base of the proposed dam within a coastal oak woodland. Construction of this facility would likely require the removal of some oak trees.

Mitigation Measure

9.2.8-2 *Specific mitigation measures for these potential impacts cannot be identified at this time. Prior to final approvals for this alternative each of the road access routes, borrow site(s), and construction facilities will have to be identified and evaluated for impacts, and the appropriate mitigation measures identified at that time. The riparian habitat eliminated at the water intake structure and pumping station will be compensated for. The habitats disturbed for the transmission pipeline and treatment plant will be replanted at these sites or in a nearby offsite location.*

Some suggested mitigation approaches would be to avoid sensitive vegetation plant communities and wildlife habitats such as the closed-cone pine forest and the coastal oak woodlands, especially the Monterey pine forests. Impacts related to construction noise could be minimized by timing those activities in the periods in which raptor and other sensitive species are not nesting, and by locating those activities as far away from nesting sites as possible. Disturbed areas should be revegetated with native plant species identical to those that were removed. If adequate mitigation cannot be achieved within the project area, an off-site location may be required (such as Garland Ranch Regional Park) for the riparian habitats.

Impact

9.2.8-3 **The proposed 25,000 AF Cañada Reservoir would inundate and eliminate approximately 0.8 acres of riparian habitat, and the intake structure on the Carmel River would disturb an additional 3.6 acres of riparian habitats, for a total of 4.4 acres. See Impact 9.2.1-3 for more details on this impact.**

Mitigation Measure

9.2.8-3 *The MPWMD proposes to restore and enhance 6.3 acres of riparian habitat within the Garland Ranch Regional Park along the Carmel River. See the discussion on Mitigation Measure 9.2.1-3 and in Appendices 9-E and 9-F for more details on the methods used to determine the amount of mitigation area needed and the details on the proposed riparian habitat enhancement and restoration efforts.*

Impact

9.2.8-4 **Less than 0.1 acre of marshland would be inundated by the 25 CAN alternative. This is considered to be a less than significant impact.**

Mitigation Measure

9.2.8-4 *No mitigation measures would be required.*

Impact

9.2.8-5 **The proposed reservoir would inundate and eliminate populations of two sensitive plant species (Monterey pine and Carmel Valley bush mallow). The project would improve habitat values for two sensitive wildlife species (golden eagle and norther harrier) and adversely affect the habitats for two other sensitive wildlife species (yellow warbler and black-shouldered kite) identified in the project area.**

The impacts to the Carmel Valley bush mallow are considered moderate and mitigable. The adverse impacts to the yellow warbler and black-shouldered kite are considered minor and do not pose a threat to the continued existence of these species in the region

Mitigation Measure

9.2.8-5 *The Carmel Valley bush mallow population may be transplanted to a site outside of the inundation zone. The proposed riparian restoration efforts at Garland*

Ranch Regional Park would improve habitat quality for the yellow warbler in this portion of the Carmel River.

Bush mallows are easily propagated and are used in garden landscapes throughout the Monterey Bay region. To further improve the habitat quality for the yellow warbler, it is suggested that a predator control program be incorporated into the resource management plans for the area. The principal parasitic species for the yellow warbler is the cow bird.

This alternative would have a moderate impact to sensitive plant and wildlife species when compared to the other alternatives

Impact

9.2.8-6 **The 25 CAN would have similar impacts to the 16 NLP/D alternative (Impact 9.2.2-6) except that about 20 acres of riparian woodland would be significantly affected in normal years.[64] Overall, the 25 CAN would result in beneficial impacts when compared to the existing situation.**

In wet years this alternative would benefit the riparian habitats of the Carmel River Valley compared to the No Project. In normal water years significant drawdown would be localized in the area of the Rancho Cañada well. In critically dry water-years, approximately 109 acres of the riparian woodland habitats in the lower region would be affected. In worst-case water years drawdowns would affect a total of 205 acres in the middle and lower river sections (see Figure 9-9).

Mitigation Measure

9.2.8-6 *See Mitigation Measure 9.2.2-6.*

9.2.9 7 MGD DESALINATION PLANT

Impact

9.2.9-1 **The 7 DSL alternative would have an effect on the riparian vegetation of the lower Carmel River similar to the 9 NLP/D alternative (Impact 9.2.3-6), and would result in significant adverse impacts to 70 to 165 acres of riparian woodland in all types of water years. Impacts would be concentrated in the lower river section.**

Though this alternative would result in significant drawdown effects in all types of water years in the lower section of the river (Subunits 3 and 4), it is the only alternative that would not significantly affect the middle section (Subunit 2) in the worst case scenario (see Figure 9-9). Overall, it would represent a slight improvement over existing conditions, but still be adverse and significant.

Mitigation Measure

9.2.9-1 *See Mitigation Measure 9.2.3-6. The impact would remain as potentially significant and unavoidable.*

Impact

9.2.9-2 **The construction of a 3 MGD or 7 MGD desalination plant could have a significant impact on sensitive habitats or species. At this time specific impacts cannot be identified because the siting of these facilities has not been completed. Detailed evaluations will be completed in a separate Desalination Project EIR.**

Several sensitive plant species are known from the dune areas of Monterey County. These include Monterey spine flower, Menzies' wallflower, and sand gilia. In addition, several sensitive species are known historically from this area and may still exist in isolated populations. Although most of the proposed pipeline route is highly disturbed habitat, it is possible that some of these species could exist there. These species are described in Table 9-4.

Marsh vegetation occurs along Moro Cojo Slough, just south of the slough, and at other spots along the route. Riparian vegetation occurs along the Salinas River crossing. As a result, a wetland delineation would likely be necessary in order to determine the extent of wetland vegetation that would be affected by a desalination plant.

Impacts to sensitive wildlife species along the proposed desalination plant pipeline route would be most significant if they eliminate or disturb the habitats of the less mobile animals such as the black legless lizard, California tiger salamander or Santa Cruz long toed salamander. Construction activities in and near any habitats deemed suitable for these species could result in the taking of the animals themselves as well as their habitat.

Smith's blue butterfly could be affected by construction activities in the Marina Dunes. Large areas of habitat for this species occur from the State Park to the Salinas River and these areas could be affected by elements of a desalination plant.

Mitigation Measure

9.2.9-2 *Specific mitigation measures cannot be identified at this time. Mitigation approaches to be considered when the facility sitings are complete and the specific impacts are identified include: avoidance of sensitive habitats and species; compensation for the loss of those habitats and species that cannot be avoided; and minimizing impacts by avoidance and/or compensation.*

Specific surveys should be conducted along the final desalination pipeline route to identify habitats suitable for the existence of the black legless lizard, California tiger salamander or Santa Cruz long-toed salamander Searches in these habitats will identify the presence or absence of any of these animals prior to construction. If any are present measures will be designed to protect them and their habitat which are specific to each site at which they are encountered

Surveys for sensitive plant species, including the Monterey spineflower, Menzies' wallflower, sand gilia, and seaside bird's-beak, will need to be conducted along the pipeline route and where construction would take place. A wetland delineation would probably be required if a desalination plant would result in the fill of wetlands or the alteration of riparian habitat.

9.2.10 NO PROJECT ALTERNATIVE

Impact

9.2.10-1 **Significant or severe regional drawdown would occur in the Lower River Section (Subunits 3 and 4) in all water-years under this alternative. Significant regional drawdowns would spread to the middle section (Subunit 2) of the river in the worst-case scenario. Overall, this alternative would result in a significant impact to the riparian habitats of the Carmel River Valley.**

The expected drawdown levels in the lower section of the Carmel River Valley in all four of the water-year types would be similar in extent to the 9,000 AF New Los Padres alternative and the 7 DSL alternative The No Project alternative would be one of the poorer performers in terms of groundwater drawdown in the lower river section (See Figure 9-9)

Under the No Project alternative, streamflow in the Carmel River would be reduced to zero during parts of normal and dry years. The lack of streamflow, in combination with lowered water tables due to pumping, would damage or destroy some of the riparian vegetation during extended dry periods. The frequency of the dominant channel-forming flood would remain the same as under present conditions, as would the rate of sediment transport. However, with continued lowering of groundwater levels and depleted streamflow, riparian vegetation would not recover and might decline further. The lack of bank vegetation would result in continued channel instability and consequent erosion damage.

Mitigation Measure

9.2.10-1 *See Mitigation Measure 9.2.3-6 This impact would remain a potentially unavoidable significant impact.*

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10. TRAFFIC

10.1 SETTING

This section addresses only the direct effects on traffic levels that would result from the construction and operation of the alternative water supply facilities. Chapter 19 discusses the secondary effects on traffic that would result from growth within the Monterey Peninsula.

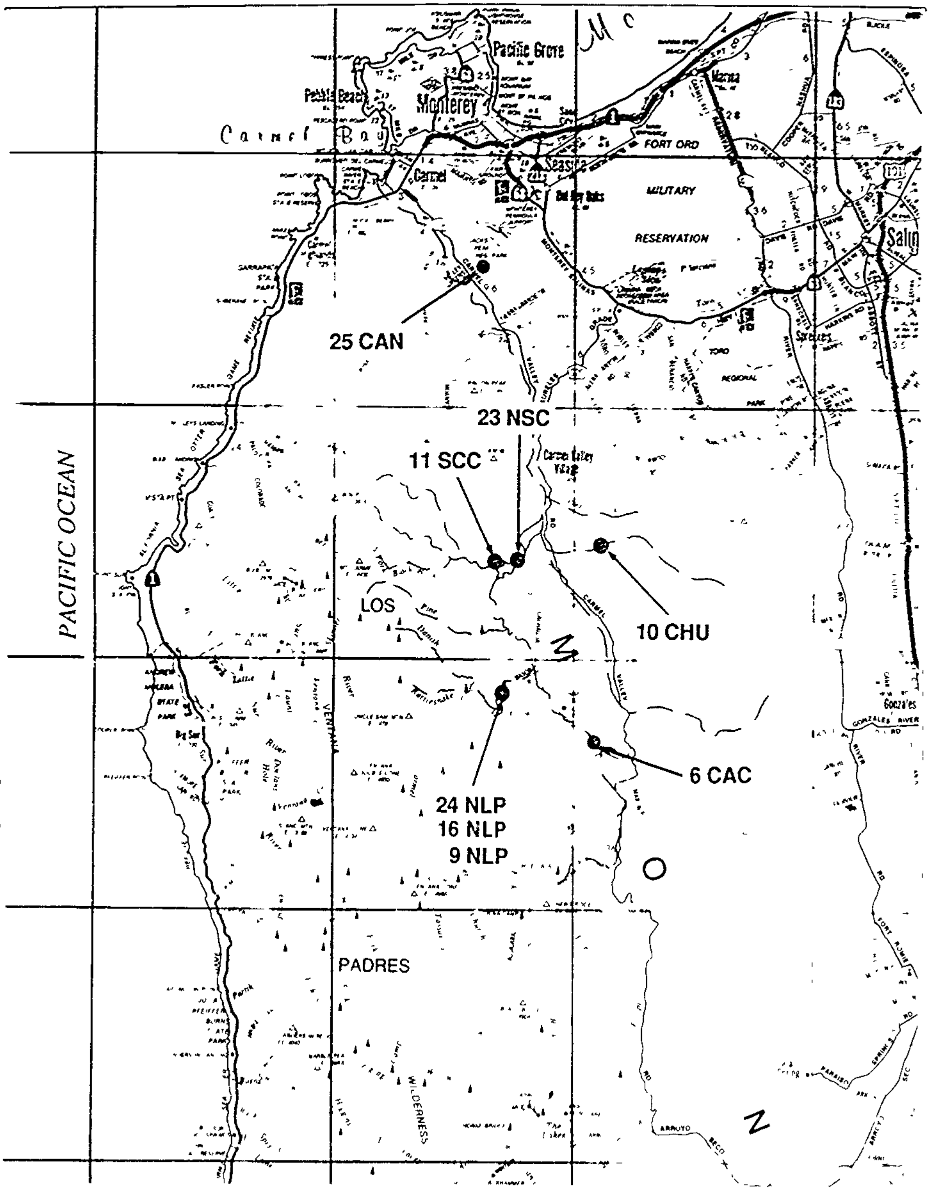
As shown in Figure 10-1, each of the reservoir alternatives would be accessible via Carmel Valley Road and, most likely, Highway 1. Highway 68 is a major transportation link between Salinas and the Monterey Peninsula.

Carmel Valley Road is a rural highway that extends about 50 miles from Highway 1 in Carmel to Highway 101 in Greenfield Carmel Valley Road consists of four lanes at the mouth of Carmel Valley but narrows to two lanes toward Carmel Valley Village. The four-lane section begins at Carmel Rancho Boulevard and ends just west of Rancho San Carlos Road, this road segment includes improved shoulders and a landscaped median that contains left-turn pockets at intersections The road segment from Rancho San Carlos Road to Laureles Grade is a two-lane roadway with improved shoulders and left-turn pockets at most intersections. The pavement narrows east of Laureles Grade, with only one left-turn pocket at Ford Road. East of Esquiline Road, Carmel Valley Road narrows further, with no left turn pockets and undeveloped shoulders

Traffic control on Carmel Valley Road is generally exercised by stop signs on entering streets The intersection of Carmel Valley Road and Carmel Rancho Boulevard is controlled by a multi-phase traffic signal providing left-turn phasing for east- and westbound vehicles Carmel Valley Road is controlled by a yield sign at the T-intersection with Highway 1. However, at this intersection turning movements are limited to northbound right turns and southbound left turns from Highway 1 to Carmel Valley Road and westbound right turns from Carmel Valley Road to Highway 1. In

VEHICULAR ACCESS FOR PROPOSED WATER SUPPLY ALTERNATIVES

FIGURE 10-1



order to travel south on Highway 1 from westbound on Carmel Valley Road, it is necessary to make a left turn at Carmel Ranch Boulevard, a right turn at Rio Road and then a left turn at Highway 1.

Table 10-1 presents recent traffic count data collected by the Monterey County Department of Public Works. It is apparent that there is little through traffic on Carmel Valley Road. The trip between Carmel and Greenfield can be more easily made using Highways 68 and 101. Most of the traffic on Carmel Valley Road east of Highway 1 enters and leaves via Highway 1 or is purely local.

The heaviest traffic on the section of Carmel Valley Road occurs east and west of its intersection with Carmel Rancho Boulevard, just east of Highway 1. The majority of the traffic is generated by commercial development near this intersection.

The County of Monterey is presently revising its Carmel Valley Master Plan, and has prepared a Subsequent EIR to the 1986 Carmel Valley Master Plan EIR.[1] This Supplemental EIR is evaluating a number of revisions to the land use and transportation policies of the existing Carmel Valley Master Plan. The primary objectives of the revised master plan are to balance growth with transportation improvements that are feasible both physically and economically, and to provide a circulation improvement program, including physical improvements and cost allocation principals.

Specific improvements to Carmel Valley Road that are being evaluated at a program level include

- provision of a traffic signal at the intersection of Rio Road and Carmel Valley Road,
- widening the 4.4-mile section from Via Petra to Robinson Canyon Road from two to four lanes,
- preservation of the existing two-lane road from Robinson Canyon Road to Ford Road, with the addition of paved shoulders and left-turn channelization, and
- shoulder improvement and possible curve realignment east of Esquiline Road

In addition, the plan recommends that Highway 1 be widened from two to four lanes between Carmel Valley Road and Rio Road in conjunction with the proposed Hatton Canyon Freeway project. The plan also calls for the monitoring of traffic conditions on Carmel Valley Road

TABLE 10-1

EXISTING TRAFFIC VOLUMES AND PEAK HOUR LOS DATA WITHIN THE PROJECT AREA

Segment	1990[1] AADT	Peak[2] Hour	Peak Hour LOS
Highway 1			
North of Carmel Valley Road	42,000[3]	4,600[3]	F
South of Carmel Valley Road	20,900[3]	2,300[3]	F
Carmel Valley Road			
Highway 1 to Carmel Rancho Boulevard	21,030	2,100	F
Carmel Rancho Boulevard to Rio Road	24,486	2,450	A
Rio Road to Rancho San Carlos Road	17,849	1,780	A
Rancho San Carlos Road to Schulte Road	15,300	1,530	D
Schulte Road to Robinson Canyon Road	13,688	1,370	D
Robinson Canyon Road to Laureles Grade	10,637	1,060	D
Laureles Grade to Ford Road	11,941	1,190	D
Ford Road to Esquiline Road	9,129	910	C
Esquiline Road to Cachagua Road[3]	2,000	200	B
Cachagua Road to Martin Road[3]	600	60	B
Laureles Grade			
North of Carmel Valley Road	5,000	500	D
South of Highway 68	5,800	580	D
Highway 68			
Highway 1 to Josselyn Canyon	20,200	2,020	A
Josselyn Canyon to Olmstead	20,200	2,020	E
Olmstead to Highway 218	20,200	2,020	E
Highway 218 to York	17,900	1,190	E
York to Toro Park Intersection	16,700	1,670	E
East of Toro Park Intersection	19,600	1,960	A
Cachagua Road			
Tassajara Road to Carmel Valley Road	500	50	--

[1] AADT means annual average daily traffic.
[2] Estimated at 10 percent of AADT.
[3] 1985 AADT
Source: Caltrans. Traffic Volumes on State Highways, 1989.

The schedule for implementation of these elements is uncertain at the time of writing. However, for this section it is assumed that these road improvements will not be completed prior to the start of any dam construction.

A common measure of a road or intersection's performance is the level of service (LOS) provided during the heaviest traffic flow. The LOS is defined as the ratio of the volume of traffic to the capacity of the intersection or road segment. LOS is defined by letter grades: LOS A refers to completely uncongested traffic flow, while LOS F refers to extreme congestion. LOS C (light congestion with occasional back-ups) is considered the minimum level of service that should be provided by an intersection or road segment during peak hour demands, it has been established as the minimum service standard for Carmel Valley Road.[1] LOS B refers to stable traffic flow with slight restrictions, while LOS D refers to traffic approaching unstable flow. Tables 10-1 and 10-2 presents the existing peak hour LOS data for pertinent portions of Carmel Valley Road. In general, unacceptable level of service standards exist for the portion of Carmel Valley Road near the intersection with Highway 1.

As shown in Figure 10-1, each of the project alternatives would affect different portions of the existing road network. The New San Clemente and San Clemente Creek alternatives can only be reached via San Clemente Drive, a private road that extends from Carmel Valley Road to the existing San Clemente Dam The Cachagua Creek alternative is accessible via Cachagua Road, while the New Los Padres alternative is accessible via Cachagua Road to Nason Road. The Cañada Reservoir alternative would affect about 5.7 miles of Carmel Valley Road, access to the Cañada Dam construction site would also occur via Highway 68.

10.2 IMPACTS OF PROJECT OPERATION

STANDARDS OF SIGNIFICANCE

A project would generally be considered to have a significant adverse impact on traffic if its long-term operation were to result in the degradation of the level of service of an intersection or road segment to below LOS C, or would necessitate the upgrade or expansion of the existing road network.

TABLE 10-2

INTERSECTION PEAK-HOUR LEVELS OF SERVICE

Location	Peak-Hour LOS
Highway 1 and Carmel Valley Road	F[1]
Highway 1 and Rio Road	F[1]
Carmel Valley Road and Carmel Rancho Boulevard	D
Carmel Valley Road and Laureles Grade	A/F[2]

[1] Blocked by downroad congestion on Highway 1 from Ocean Avenue to the intersection with Carmel Valley Road.

[2] Unsignalized intersection: LOS=A for eastbound to northbound left turn, LOS=F for southbound to eastbound left turn.

Source: Planning Analysis and Development, Draft Environmental Impact Report Carmel Valley Road Improvement Plan, December 1990.

10.2.1 RESERVOIR ALTERNATIVES

Impact

10.2.1-1 **Operation of each of the proposed reservoir alternatives would result in a slight increase in long-term traffic volumes in the vicinity of the dam sites.**

Table 10-3 presents the estimated average daily traffic volumes that would be generated by each of the reservoir alternatives during the long-term operational life of the project. Each reservoir would be visited twice each day by operation and maintenance personnel, for a total of four vehicle trips. In addition, the New Los Padres and New San Clemente alternatives would include the truck transport of anadromous fish for about eight months per year, with an annual average of about five trips per day from upstream of the dam to downstream of the dam. None of the project alternatives would affect the levels of service provided by the existing road network, and therefore would have a less than significant impact on traffic.

Some degree of channel clearing and maintenance would be associated with the larger reservoir alternatives (24 NCP, 16 NCP/D, 9 NLP/D, 23 NSC, 11 SCC, and 25 CAN) as described in Chapter 7. These operations would be essentially gravel mining operations conducted during the low flow summer months. There could be brief periods of relatively intense activity (i e., 10 to 15 truckloads per day for one to two weeks), but the overall effect would be insignificant. In addition, there would be a few truck trips per year associated with each alternative to replenish spawning gravels to the river; this impact would also be considered insignificant.

Mitigation Measure

10.2.1 1 *Truck trips associated with cleaning and maintenance would be scheduled between the hours of 9 a.m. and 4 p.m. to avoid peak traffic periods. The overall impact on traffic would be less than significant.*

10.2.2 DESALINATION ALTERNATIVES

Impact

10.2.2 1 **Operation of one of the alternative desalination plants would result in a slight long-term increase in traffic volumes**

TABLE 10-3

OPERATIONAL TRAFFIC LEVELS OF PROJECT ALTERNATIVES

Alternative	Average Daily Vehicle Trips	
	Car	Truck[1]
New San Clemente	4	5
New Los Padres (all sizes)	4	5
San Clemente Creek	4	–
Chupines Creek	4	–
Cachagua Creek	4	–
Cañada	31	–

[1]Truck trips are for fish transport.

Source: EIP Associates

Operation of a desalination plant would not be expected to generate a significant volume of traffic (i.e., a volume that would result in the degradation of level of service standards on nearby roadways). There would likely be some traffic generated as workers commuted to and from the plant, and a few truck trips per week would probably be necessary for the delivery of supplies. An estimated 10 workers would be necessary to operate a 7 MGD desalination plant, adding 20 vehicular trips per day, while an estimated seven workers would operate a 3 MGD plant, adding 14 daily trips. In addition, several truck trips per week would be necessary to deliver equipment and supplies to the plant. However, plant shift changes and truck delivery times could be scheduled so as to avoid adding vehicular trips during peak hours. Therefore, no significant impacts to long-term traffic volumes are anticipated.

Mitigation Measure

10.2.2-1 *Shift changes and truck deliveries at the desalination plant could be scheduled to avoid peak hour travel times.*

10.2.3 NO PROJECT ALTERNATIVE

Impact

10.2.3-1 **The No Project Alternative would result in no increase in long-term operational traffic levels.**

The existing dams are visited twice a day by operation and maintenance personnel, and these visits would continue. However, no degradation of level of service, and hence no significant impact, would occur as a result of the No Project alternative.

Mitigation Measure

10.2.3-1 None necessary

10.3 IMPACTS OF PROJECT CONSTRUCTION

STANDARDS OF SIGNIFICANCE

A project would generally be considered to have a significant adverse impact on traffic if its short-term construction phase were to result in a degradation of roadway conditions to below LOS C or would add vehicular trips to a roadway already operating unacceptably (LOS D or worse), would

necessitate the upgrade or expansion of the existing road network, or would cause substantial disruption or delay in existing traffic patterns, thus substantially inconveniencing a large number of motorists.

10.3.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

Impact

10.3.1-1 **Construction of the 24,000 AF New Los Padres project would result in a temporary increase in traffic levels during the 22-month construction period.**

During project construction, traffic volumes on Carmel Valley Road and Cachagua Road would increase. The estimated construction traffic levels are shown in Table 10-4, while Table 10-5 presents a breakdown of the truck deliveries. Because roller-compacted concrete must be placed continuously, work at the site during this approximately six-month phase would proceed around the clock. During the six-month peak phase of construction, about 20 truck trips each day, 10 in each direction, seven days per week, would be necessary to transport construction materials and equipment to the dam site. In addition, an estimated 176 automobile trips per day would occur during the six-month peak construction period to transport workers to and from the construction site. It is assumed that all of these trips would occur on Carmel Valley Road between State Highway 1 and the site, although it is possible that a few workers might use Laureles Grade from Highway 68. Average daily traffic volumes on Carmel Valley Road would be increased by about 33 percent near the dam site. The percentage increase would decline, moving westward, to a value of less than one percent at the Carmel Valley Road/State Highway 1 intersection.

Although the percentage change in average daily traffic volumes resulting from the project would be small, particularly west of Ford Road, the additional truck traffic would be noticeable. During the off-peak hours, the impact would be primarily visual and would not materially affect traffic flow. Traffic resulting from a shift change at or near midnight might also be noticeable because existing traffic flows at that time are light.

A shift change at the construction site during the afternoon peak hour (typically 5:00 to 6:00 pm) would generate up to 60 additional vehicular trips, truck deliveries of equipment or materials could also add a few trips to peak-hour traffic volumes. At present, Carmel Valley Road operates at

TABLE 10-4

24,000 AF NEW LOS PADRES
ESTIMATED CONSTRUCTION TRAFFIC LEVELS

Phase	Duration, Months	Vehicle Trips Per Day[1] Cars[2]	Trucks
Mobilization	12[3]	106	0.5[5]
Construction	4[3]	106	13
	6[4]	176	20

[1] One round-trip equals two vehicle trips.
[2] Assumes 1.3 workers per vehicle.
[3] Five days per work week.
[4] Seven days per work week.
[5] Does not include truck trips for firewood removal.

Source: Bechtel Civil, Inc.

TABLE 10-5

ESTIMATED TRUCK DELIVERIES TO
THE NEW LOS PADRES DAM CONSTRUCTION SITE

Material	Duration (Months)	Intensity (Loads/Month)	Total Trips
Cement	4	100	400
	6	300	1,800
Steel	10	2	20
Lumber	6	1	6
Dynamite	10	1	10
Fuel	20	4	80
TOTAL			2,256

Source: Bechtel Civil, Inc.

LOS D between Rancho San Carlos Road and Ford Road, a distance of about eight miles (see Table 10-1). Worse yet, Highway 1 operates at LOS F both north and south of Carmel Valley Road. Thus, the addition of any peak-hour vehicular trips to either Carmel Valley Road or Highway 1 would constitute a significant impact.

While the existing Levels of Service are not expected to change substantially in the near future, it is possible that the road improvements planned for Carmel Valley Road and Highway 1 (see Section 10.1 for a description of these improvements) could be completed prior to the start of construction of the proposed dam. In this case, the level of service provided by the road network would be improved considerably, as compared to the present conditions. If the planned road improvements were completed when dam construction commenced, the significance of the impacts on traffic levels would be correspondingly reduced.

East of Carmel Valley Village, Carmel Valley and Cachagua Roads become narrow, steep and winding. It would prove difficult for the larger trucks to negotiate some small radius turns without entering the opposing traffic lane.

The areas to be inundated would need to be cleared and grubbed prior to filling the reservoir. Timber harvesting could generate numerous lumber truck trips while the lumber and firewood was being transported out from the reservoir site.

Mitigation Measures

10.3.1-1 *The following measures are suggested to mitigate the effects of project construction on traffic flow on Carmel Valley Road and Highway 1.*

a) *The number of workers' vehicles using Carmel Valley Road could be reduced by establishing a work camp at or near the site.*

b) *Working hours would be set so as to avoid shift changes during peak hours; for example, normal working hours of 6.00 a.m. to 3:30 p.m. could be established.*

c) *A worker parking area and shuttle buses could be provided to reduce the volume of traffic on Carmel Valley Road. The parking area would need to be about one-half acre, and could be located in the western portion of Carmel Valley, or outside the Valley altogether Potential parking areas include a vacant field, or possibly a church parking lot for use during the*

week; alternatively, a lot could be developed that would have civic use after project construction was completed.

d) *Trucks delivering construction materials or supplies would be prohibited from traveling to or from the site during peak traffic flow periods, and would be limited to daylight hours only.*

e) *Heavy trucks traversing the narrow and winding sections of Carmel Valley and Cachagua Roads near the dam site would be accompanied by a flagman or pilot vehicle to improve traffic safety.*

f) *Trucks hauling timber and firewood from the reservoir inundation area would be scheduled to avoid peak hour traffic periods.*

Because traffic levels on Carmel Valley Road and Highway 1 are presently operating below LOS C, any addition of traffic would be significant. Therefore, while the mitigation measures provided would lessen the impacts of dam construction on traffic, and the remaining impacts would not be permanent, the overall impact of dam construction would be significant and unavoidable, but not permanent.

10.3.2 16,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (16 NLP/D)

Impact

10.3.2-1 **Construction of the 16 NLP/D alternative would result in temporary increase in traffic levels during the 21-month construction period.**

Construction impacts of the 16,000 AF New Los Padres alternative would be essentially the same as described in Section 10.3.1 for the 24,000 AF New Los Padres alternative, except that the duration of construction would be lessened somewhat. The peak construction period would be about one-half month shorter than for the 24 NLP alternative, lasting about 5.5 months.

While the site of the desalination plant has not yet been determined, plant construction would take an estimated nine to 12 months. The work force is estimated at about 30 workers in the beginning and end of construction, with a peak of about 50 workers in the middle. Several hundred truck trips would also be associated with the construction of the plant and associated pipelines. This issue will be addressed in additional detail in a separate EIR, which will include site-specific mitigation measures.

Mitigation Measures

10.3.2-1 a) *The mitigation measures provided in Section 10.3.1 for the 24 NLP alternative would be applicable to the dam portion of this alternative.*

b) *Desalination plant construction would schedule shift changes and truck deliveries to avoid peak periods.*

10.3.3 9,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (9 NLP/D)

Impact

10.3.3-1 **Construction of the 9 NLP/D alternative would result in a temporary increase in traffic levels during the 20-month construction period.**

Construction impacts of the 9,000 AF New Los Padres Dam and Reservoir would be essentially the same as described in Section 10.3.1 for the 24,000 AF New Los Padres project, except that the duration of construction would be lessened somewhat. The peak construction period would be expected to last for five months, otherwise, the estimated traffic levels would be as shown in Table 10-4.

The effects on traffic resulting from construction of the desalination plant are discussed in Section 10.3.2 for the 16 NLP/D alternative.

Mitigation Measures

10.3.3-1 *The mitigation measures presented in Section 10.3.2 would also be applicable to this alternative*

Because traffic levels on Carmel Valley Road and Highway 1 are presently operating below LOS C, any addition of traffic would be significant. Therefore, while the mitigation measures provided would lessen the impacts of dam construction on traffic, and the remaining impacts would not be permanent, the overall impact of dam construction would be significant and unavoidable, but not permanent.

10.3.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

Impact

10.3.4-1 **Construction of the 23,000 AF New San Clemente project would result in a temporary increase in traffic levels during the 22-month construction period.**

Access to the site of the proposed New San Clemente Dam would be via Carmel Valley Road to San Clemente Drive, a private roadway through the Sleepy Hollow subdivision. Because this alternative would be an RCC dam similar in size and construction technique, and in relatively close proximity to the proposed 24,000 AF New Los Padres Dam, the effects of construction of this alternative would be essentially the same as those discussed in Section 10.3.1. One exception is that traffic on Cachagua Road would not be affected to the same degree.

Mitigation Measures

10.3.4-1 *The mitigation measures presented in Section 10.3.1 would also be applicable to this alternative.*

In addition, the following mitigation measures are proposed to reduce the effects on San Clemente Drive in the Sleepy Hollow subdivision:

- *The bridge near the entrance would be rebuilt.*
- *The entrance from Carmel Valley Road would be reconfigured.*
- *Turnouts would be provided at intervals*
- *Any displaced utilities would be placed underground.*
- *The roadway would be restored to its original condition when construction is complete*
- *Twenty-four-hour security could be provided at the entrance.*
- *Restrictions on construction vehicle speed and timing would be imposed.*
- *Workers could be driven to the site in buses or vans rather than in private automobiles.*
- *Trash generated by construction activities would be regularly picked up and any other necessary maintenance undertaken.*
- *Temporary fencing could be erected between houses and the roadway to enhance safety and privacy.*

Because traffic levels on Carmel Valley Road and Highway 1 are presently operating below LOS C, any addition of traffic would be significant. Therefore, while the mitigation measures provided would lessen the impacts of dam construction on traffic, and the remaining impacts would not be permanent, the overall impact of dam construction would be significant and unavoidable, but not permanent.

10.3.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

Impact

10.3.5-1 **Construction of the 6,000 AF Cachagua Creek project and the 3 MGD desalination plant would result in a temporary increase in traffic levels.**

Access to the proposed Cachagua Creek dam site would be via Carmel Valley Road to Cachagua Road. Because no detailed (final) design is available for this alternative, the analysis of construction traffic levels is estimated based on the results of similar projects.

Dam construction is expected to last for approximately two years. An average of about 20 round-trip truck trips per week (40 one-way trips) would be expected for the delivery of equipment, fuel, materials and supplies, about 50 round-trip truck trips per week (100 one-way trips) could be expected during the six month peak construction phase. An average of 50 workers per day would commute to the site. Assuming 1.3 workers per vehicle, this would result in about 80 additional vehicle trips per day along Carmel Valley Road. The number of workers would double during the six-month peak construction phase. Work at the site could occur up to six days per week, 12 hours per day. This level of traffic added to the existing road system would be significant, especially at the Highway 1/Carmel Valley Road intersection.

Construction of the proposed Cachagua Creek Dam would necessitate the relocation of the existing Cachagua Road and Jamesburg Road, the proposed locations of these revised roads are shown in Figure 4-16. This relocation would not be expected to affect vehicular travel along these roadways because the new roads would be constructed while the existing road remained in service, and no interruption of travel is anticipated, this impact is therefore considered insignificant. The existing Cachagua Road would be used as an access road for the completed dam.

The effects on traffic resulting from the construction of the desalination plant are discussed in Section 10.3.2 for the 16 NLP/D alternative.

Mitigation Measure

10.3.5-1 *The mitigation measures presented in Section 10.3.2 for the 16 NLP/D alternative would apply to this alternative also.*

Because traffic levels on Carmel Valley Road and Highway 1 are presently operating below LOS C, any addition of traffic would be significant. Therefore, while the mitigation measures provided would lessen the impacts of dam construction on traffic, and the remaining impacts would not be permanent, the overall impact of dam construction would be significant and unavoidable, but not permanent.

10.3.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

Impact

10.3.6-1 **Construction of the 11,000 AF San Clemente Creek project would result in a temporary increase in traffic levels.**

Access to the site of the San Clemente Creek alternative would be via Carmel Valley Road to San Clemente Drive, a private roadway through the Sleepy Hollow subdivision. Because this alternative would be an RCC dam similar in size and in close proximity to the 23,000 AF New San Clemente alternative, the effects of construction of this alternative would be essentially the same as those discussed in Section 10.3.4. However, because this alternative would include a pumped storage component, there would be an additional increase in construction traffic associated with the 11,000 AF San Clemente Creek alternative. Construction of the pumping plant would be concurrent with the RCC dam construction, resulting in an additional 40 daily vehicular trips and one truck trip per day, five days per week, during the six-month peak construction period. Table 10-6 presents a summary of the estimated traffic levels that would be associated with the construction of this alternative, while Table 10-7 presents a breakdown of the expected truck deliveries.

TABLE 10-6

11,000 AF SAN CLEMENTE CREEK
ESTIMATED CONSTRUCTION TRAFFIC LEVELS

		Vehicle Trips Per Day[1]	
Phase	Duration, Months	Cars	Trucks
Mobilization	12[2]	68	0.5[4]
Construction	4[2]	68	8
	6[3]	114	10
	6[5]	40	1

[1] One round-trip equals two vehicle trips.
[2] Five days per work week.
[3] Seven days per work week.
[4] Does not include truck trips for firewood removal.
[5] This traffic would result from the construction of the pumping plant, and would proceed concurrently with dam construction, although continuous work would not be necessary; rather, five working days per week would be sufficient.

Source: Bechtel Civil, Inc.

TABLE 10-7

ESTIMATED TRUCK DELIVERIES TO
THE SAN CLEMENTE CREEK DAM CONSTRUCTION SITE

Material	Duration (Months)	Intensity (Loads/Week)	Total Trips
Cement	4	25	400
	6	70	1,800
	1	7.5	30
Steel	10	1	40
Lumber	6	0 25	6
Dynamite	10	0 25	10
Fuel	20	1	20
Pipe	1	6	25
Pumps, Motors and Other Equipment	1	4	15
TOTAL			2,346

Source: Bechtel Civil, Inc.

Mitigation Measures

10.3.6-1 *The mitigation measures presented in Section 10.3.4 for the 23 NSC alternative would also be applicable to this alternative.*

10.3.7 10,500 AF CHUPINES RESERVOIR (10 CHU)

The effects on traffic that would result from construction of the 10 CHU alternative would be essentially the same as described in Section 10.3.5 for the 6 CAC/D alternative, while the mitigation measures would be the same as those described in Section 10.3.1 for the 24 NLP alternative.

10.3.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

Impact

10.3.8-1 **Construction of the 25,000 AF Cañada Dam and Reservoir would result in a significant increase in traffic levels.**

A separate traffic study was performed to evaluate the construction impacts of the 25 CAN alternative.[2] This study concluded that traffic impacts could be reduced by constructing an access road to the construction site via Highway 68 rather than accessing the site from Carmel Valley Road.

Construction activities would last for an estimated four years. Dam construction would involve an average work force of 55 persons, with a peak of 80. This would mean that an average of about 160 vehicle trips per day would occur, with up to 29 peak hour vehicular trips per day. At the peak of construction, about 240 vehicle trips per day would occur.

A total of about 1.9 million cubic yards of material would need to be imported to allow the construction of this alternative. This material would likely come from quarries near Aromas, Soledad and Marina, and access to the dam site would be via Highway 68. A total of about 90,000 truck trips would be necessary to transport this material, or a total of about 180,000 one-way trips. Assuming that the material would be imported over a period of three years, there would be an average of 144 truck trips per day, six days per week. For a ten-hour day, this would equal 14.4 trips per hour. An additional 20 truck trips per day would be necessary to deliver equipment, fuel, materials and supplies to the site.

In addition to the Cañada Dam, a water treatment facility would also be constructed as part of this alternative. Access to this project would be via Highway 1 and Carmel Valley Road. Water treatment plant construction would involve a peak of 50 workers and 150 vehicular trips per day, and an average of 170 truck trips per day. A summary of the traffic volumes associated with this alternative is presented in Table 10-8.

No change in level of service is expected to occur as a result of construction of this alternative.[3] The project would, however, contribute vehicular trips to road segments that are presently operating below LOS C; for this reason, the project impacts are considered significant.

Mitigation Measures

10.3.8-1 (a) *Highway 68 shall be used as much as possible for construction access in order to avoid Highway 1 and Carmel Valley Road.*

(b) *Upon completion of construction, all roadways in the project vicinity shall be restored to preproject conditions, or an equivalent amount of funding would be contributed for roadway repair and upgrade.*

(c) *Funding would be provided for the channelization and traffic control at access points on Carmel Valley Road and Highway 68. This could include signalization, left- or right-turn channelization, or widening of the approach roads.*

(d) *A work zone traffic control plan would be prepared for both Highway 68 and Carmel Valley Road.*

(e) *Workers could be transported to the construction site via carpools, vanpools or shuttle bus with satellite parking, if possible.*

Even with the implementation of these mitigation measures, the impacts on traffic that would result from this alternative would be significant and unavoidable, for a period of four years.

TABLE 10-8

ESTIMATED CONSTRUCTION TRAFFIC LEVELS
25,000 AF CAÑADA DAM AND RESERVOIR

Element	Peak Vehicle Trips Per Day		Total Vehicle Trips	
	Car	Truck	Car	Truck
Dam	240	150	206,000	100,000
Water Treatment Plant	150	170	94,000	19,000
		TOTAL	300,000	119,000

Source: Keith B. Higgins and Associates, Inc.

10.3.9 7 MGD DESALINATION PLANT (7 DSL)

Impact

10.3.9-1 **Construction of the 7 MGD desalination plant would result in a temporary increase in traffic levels.**

While the specific location of the desalination plant has not yet been determined, plant construction at either Moss Landing or Marina would take an estimated 12 months. The work force is estimated at about 30 workers in the beginning and end of construction, with a peak of about 50 workers in the middle. Several hundred truck trips would also be associated with the construction of the plant and associated pipelines. This issue will be addressed in a separate environmental document and the site-specific mitigation measures will be provided at that time.

Mitigation Measures

10.3.9-1 *Desalination plant construction would schedule shift changes and truck deliveries to avoid peak periods.*

10.3.10 NO PROJECT ALTERNATIVE (NO PRJ)

The No Project alternative would have only a minor amount of associated construction, with less than significant construction-related traffic impacts, and no mitigation measures would be required.

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1. Planning Analysis and Development, Draft Environmental Impact Report Carmel Valley Road Improvement Plan, December 1990.

2. Keith B. Higgins & Associates, Inc., Cañada Reservoir Traffic Analysis Report, Monterey County, California, February 1991.

3. Ibid.

11. CLIMATE AND AIR QUALITY

A major concern regarding dam construction involves the potential impacts to air quality from project construction and operation. Air quality impacts include both short-term and long-term primary impacts, as well as secondary impacts. Short-term primary impacts include emissions from both mobile and stationary sources during the construction period, including vehicle emissions, blasting, clearing, burning, quarrying, aggregate preparation, and road dust. Long-term primary impacts include vehicle emissions, road dust, watershed management and emissions from increased electrical energy generation. Secondary impacts may result as various types of emissions combine to form secondary pollutants. The effects of each of the project alternatives on energy supplies is discussed in Chapter 16.

11.1 SETTING

The Carmel River drains a basin of 255 square miles on the Central California coast, entering the Pacific Ocean at Carmel. The upper watershed is extremely rugged with steep, narrow canyons and peaks up to 5000 feet. Orographic effects are pronounced, mean annual precipitation varies from about 16 inches at sea level near the river mouth to over 40 inches in the high peaks of the southern part of the basin. Precipitation is almost entirely rain, with the majority falling between the months of November and March

The climate of the Monterey Region is generally mild, with warm, dry summers and cool, wet winters. On the coast, monthly average maximum and minimum temperatures range from 61° F average maximum and 44° F average minimum during the winter to 68° F average maximum and 51° F average minimum in the summer, with summer temperatures kept low due to the frequent coastal fog. Temperatures are more extreme farther inland. At Carmel Valley Village, average monthly maximum and minimum temperatures range from a low of 64° F and 39° F in January to a high of 80° F and 50° F in September

This climate is primarily the result of a semi-permanent high pressure cell in the eastern Pacific, known as the Pacific High. During the summer, the Pacific High causes persistent west and northwest winds along the coast. Descending warm air in the Pacific High forms a stable temperature inversion over a cool layer of coastal air. This warmer air tends to inhibit vertical air movement, although good air quality is generally maintained by the strong on-shore flow of cool air.[1]

During the winter months, the Pacific High migrates southward and has less influence on the region. Northwest winds are still dominant, although easterly winds become more frequent. The general absence of deep, persistent inversions and the cleansing effect of storm systems tend to maintain good air quality in the area during the winter and early spring.

In the fall, surface winds diminish, and an occasional air flow reversal allows pollutants to collect over a period of days. Also, winds may develop that transport pollutants from either the San Francisco Bay area or the Central Valley to the Monterey region.

The northwest-southeast trend of the mountain ranges in the Monterey area tends to channel the on-shore air flow along the valley floors, although in the upper Carmel River watershed the more complex terrain may create localized conditions which differ markedly depending on the surrounding topography.

REGULATORY AGENCIES

A number of federal, State, regional, and local agencies are involved in the planning process for the protection of the air quality of this region. In addition, major construction projects, such as dam building, would require permits from several agencies.

At the federal level, the Environmental Protection Agency (EPA) is charged with administering the Clean Air Act and other air quality related legislation. The EPA must approve state implementation plans as required by the Clean Air Act.

In 1971, the EPA established federal standards for five major criteria air pollutants: photochemical oxidants (ozone), carbon monoxide (CO), suspended particulate matter (originally the standard applied to particulates of any diameter, termed total suspended particulates or TSP, but the standard was changed in 1987 to apply only to particulates less than 10 microns in diameter, termed PM_{10}), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). State ambient air quality standards were first established for California in 1969, pursuant to the Mulford-Carrell Act. The federal and State standards, given in Table 11-1, provide acceptable concentrations for specific contaminant levels in order to protect public health and the public welfare (to prevent damage to vegetation, property, and visibility). State standards are more stringent than federal standards, as shown in Table 11-1.

At the state level, the California Air Resources Board (CARB) is responsible for coordinating State and federal programs. CARB sets State air quality standards and coordinates local and regional plans.

At the regional level, the Monterey Bay Unified Air Pollution Control District (MBUAPCD) shares responsibility with CARB for ensuring compliance with State and federal ambient air quality standards within the North Central Coast Air Basin (NCCAB) which is comprised of Monterey, Santa Cruz, and San Benito Counties. The MBUAPCD has primary responsibility for the control of air pollution from stationary sources, which includes issuing permits and inspecting for certain types of activities. The MBUAPCD is also responsible for monitoring ambient air quality.

HISTORICAL AIR QUALITY

The NCCAB is designated as nonattainment for the State and federal ozone standards and nonattainment for the State PM_{10} standards. The more stringent California standards for ozone are exceeded on a more frequent basis than the federal standards. Appendix 11-A presents data on ozone violations for both federal and State standards from 1978-89 for nine monitoring stations operated by the MBUAPCD within the NCCAB.

Similar to ozone, State PM_{10} standards are more stringent than federal standards Although monitoring of PM_{10} has only been conducted since 1985, no violations of the federal standards have

TABLE 11-1

FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standard[3]	Federal Standards[2] Primary[4]	Secondary[5]
Ozone	1-hour	0.09 ppm (180 ug/m^3)	0.12 ppm (235 ug/m^3)	0.12 ppm (235 ug/m^3)
Carbon Monoxide	1-hour	20.00 ppm (23 mg/m^3)	35.00 ppm (40 mg/m^3)	35.00 ppm (40 mg/m^3)
	8-hour	9.00 ppm (10 mg/m^3)	9.00 ppm (10 mg/m^3)	9.00 ppm (10 mg/m^3)
Nitrogen Dioxide	1-hour	0.25 ppm (470 mg/m^3)	--- ---	--- ---
	Annual Average	--- ---	0.053 ppm (100 ug/m^3)	0.053 (100 mg/m^3)
Sulfur Dioxide	1-hour	0.25 ppm (655 mg/m^3)	--- ---	--- ---
	3-hour	--- ---	--- ---	1300 ug/m^3 (0.5 ppm)
	24-hour	0.05 ppm[6] (131 ug/m^3)	365 ug/m^3 (0.14 ppm)	--- ---
	Annual Average	--- ---	80 ug/m^3 (0.03 ppm)	--- ---
Suspended Particulate Matter (PM_{10})	24-hour	50 ug/m^3	150 ug/m^3	150 ug/m^3
	Annual Geometric Mean	30 ug/m^3	---	---
	Annual Arithmetic Mean	---	50 ug/m^3	50 ug/m^3
Sulfates	24-hour	25 ug/m^3	---	---
Lead	30 Day Average	1.5 ug/m^3	---	---
	Calendar Quarter	---	1.5 ug/m^3	1.5 ug/m^3
Hydrogen Sulfide	1-hour	0.03 ppm (42 ug/m^3)	--- ---	--- ---
Vinyl Chloride	24-hour	0.010 ppm (26 ug/m^3)	--- ---	--- ---
Visibility-Reducing Particles	1 Observation	Visibility < 10 miles[7]	---	---

TABLE 11-1 (Continued)

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[1] Concentrations expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees C and a reference pressure of 760 mm of mercury. Note: ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas. ug/m^3 = micrograms per cubic meter.

[2] National Standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

[3] California standards for ozone, carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide and particulate matter - PM_{10}, are values that are not to be exceeded. The sulfates, lead, hydrogen sulfide, vinyl chloride, and visibility-reducing particles standards are not to be equaled or exceeded.

[4] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency.

[5] National Secondary Standards. the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by the EPA.

[6] At locations where the State standards for ozone and/or suspended particulate matter are violated. National standards apply elsewhere.

[7] Prevailing visibility is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

Source: California Air Resources Board.

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been reported, however, the State standard is exceeded regularly. Appendix 11-B lists the location and dates for the PM_{10} violations in the NCCAB.

The MBUAPCD currently operates five air monitoring stations in the NCCAB in Salinas, Hollister, Carmel Valley, Santa Cruz, and Davenport. Only Salinas and Davenport are complete air monitoring stations. The others measure ozone and PM_{10}, except Carmel Valley, which measures ozone and suspended particulate. At the Carmel Valley station, the State ozone standard was exceeded for three days in 1989, with exceedances also occurring at the Hollister and Davenport stations. At the Salinas station, the closest complete air monitoring station to the proposed project sites, no violations of the State ozone standard have occurred since 1980.

Major sources of air pollutant emissions in Monterey County are fuel combustion by industrial, manufacturing, and electric utilities, solvent use, pesticide application, farming operations, construction and demolition, entrained road dust (paved and unpaved), unplanned fires, and vehicles.[2] Conditions are expected to be considerably different at the proposed project sites (compared to the air quality monitoring sites) due to the relatively few sources of pollutants in the upper Carmel Valley area. The area is sparsely populated, with no industry other than several vineyards in the Cachagua Valley. In Carmel Valley, air quality is primarily influenced by vehicle emissions, including entrained dust from both paved and unpaved roads. There is little industry and only a small amount of agriculture in Carmel Valley.

Although the NCCAB is in compliance with most air quality standards, the federal ozone standard was exceeded at Hollister and Carmel Valley in 1980 and at Hollister in 1981. For this reason, the air basin was designated a non-attainment area for ozone in the 1982 Air Quality Plan for the NCCAB. The Federal Clean Air Act requires that all non-attainment areas prepare a Plan that demonstrates attainment of the standard by 1987. While it would appear that the stationary source controls implemented as part of that plan have been effective (since only two violations have been recorded since 1981), the recent violations recorded at the Pinnacles Station by the National Park Service and the violation at the Carmel Valley station in 1989 have led to the continuation of non-attainment status for the NCCAB by the EPA.

11.2 IMPACTS OF PROJECT OPERATION

STANDARDS OF SIGNIFICANCE

Impacts of project operation would be considered long-term impacts, lasting for the duration of the project's useful life, or at least 50 years. A project would normally have a significant adverse impact on air quality if it were to result in a violation of federal or state air quality standards, if it would violate any MBUAPCD standards, or expose sensitive receptors to substantial air pollutant concentrations.

11.2.1 RESERVOIR PROJECTS

Impact

11.2.1-1 **Each of the proposed dam projects would result in a slight long-term increase in traffic levels as a result of project operation and consequently an increase in traffic-related air pollutant emissions.**

Long-term impacts are those associated with the operation of the project over the expected project life. The MPWMD engineering consultant has prepared estimates of annual operation and maintenance costs for each of the alternative projects. These estimates include the number of vehicle trips for dam inspectors. Additionally, operation of the fish passage facilities, both upstream and downstream, would involve numerous vehicle trips. Other trips would involve flow monitoring, road maintenance, and visits by government agency personnel. Overall, however, the number of vehicles and the vehicle mile- travelled would be quite small, and no long-term significant impacts to air quality are expected. Table 11-2 shows estimates of the long-term primary air quality impacts for each dam alternative. Traffic-related air pollutant emissions from the operational phase of the proposed alternatives would have a less than significant impact on air quality.

Mitigation Measures

11.2.1-1 None required or recommended.

Impact

11.2.1-2 **Operation of a large reservoir could alter th climate in the vicinity of the reservoir.**

TABLE 11-2

EMISSION ESTIMATES FOR LONG-TERM PROJECT OPERATION

Alternative	Daily VMT Car / Truck	ROG	CO	NO_x Tons/Day	TSP	PM_{10}
24 NLP 16 NLP/D 9 NLP/D	110 / 26	.00018	.0016	.00054	.0035	.0012
23 NSC	84 / 66	.00031	.0017	.00110	.0028	.0010
6 CAC/D	120 / –	.00009	.0014	.00015	.0024	.0008
11 SCC	92 / –	.00007	.0011	.00012	.0011	.0004
10 CHU	96 / –	.00008	.0011	.00012	.0012	.0004
25 CAN	36 / –	.00003	.0004	.00005	.0005	.0002

Notes:

Assumes 2 light-duty vehicle trips per day based on mileage from Monterey

For New San Clemente and New Los Padres truck trips are for fish transport with the following assumptions: 5 trips/day for 3 months, 2 trips/day for 7 months, and 1 trip/day for 2 months, with round trip mileage at San Clemente of 26 miles and Los Padres 10 miles, with the values averaged over the entire year.

Assumes average car speed 35 mph, truck speed 25 mph

Assumes only on paved roads

Source: MPWMD

While a large reservoir would have no effect on regional climatic conditions, there could be a slight alteration of the climate in its immediate vicinity. The local effects stem from the fact that the large body of water would exert a moderating influence on temperature. During hot summer days, the mass of cool water in the reservoir would lower the air temperature above it. On cold winter nights, the water mass would warm the air. Studies at other reservoirs suggest that the moderating influence would result in air temperatures downwind of the reservoir less than 1° F different from upwind air temperatures most of the time, although the temperature difference could be as much as 5° F under extreme circumstances.[3] The humidity of air passing over the water may also be increased slightly. No reports were found in the literature that indicate that the humidity rise is sufficient to increase the frequency of fog. The smaller reservoirs would be expected to have proportionally less effect on the local climate; however, even for the largest reservoir, impacts to the local climate are expected to be less than significant.

Mitigation Measures

11.2.1-2 None necessary.

11.2.2 DESALINATION ALTERNATIVES

Impact

11.2.2-1 **Operation of the 3 or 7 MGD desalination plant would consume considerable electric power, the generation of which would affect ambient air quality.**

The effects of the project alternatives on energy supplies are discussed in Chapter 16. The source of this electricity would be either the Pacific Gas and Electric Company or electricity from hydroelectric power plants purchased from facilities in the Northwest. The PG&E electrical generating facilities that would serve this project have been approved and permitted for air pollutant emissions. Electricity purchased from facilities in the Northwest would not result in any air quality impacts. Although the electrical generation emissions associated with the desalination alternatives could be substantial, they would be associated with existing permitted sources. Thus, because no permit violations would be expected, these additional air pollutant emissions associated with the desalination alternatives would be expected to result in a less than significant impact on air quality.

Mitigation Measures

11.2.2-1 None necessary.

11.2.3 NO PROJECT ALTERNATIVE

The No Project alternative would have no impact on local or regional air quality.

11.3 IMPACTS OF PROJECT CONSTRUCTION

BASIS FOR IMPACTS

Air pollutants can be classified as primary or secondary, based upon the manner in which the pollutants are formed. Primary pollutants are emitted directly from a source into the atmosphere. Examples include nitrogen oxides (NO_x), carbon monoxide (CO), sulphur dioxide (SO_2), PM_{10}, and various hydrocarbons (HC). Secondary pollutants are created over time in the atmosphere through chemical and photochemical reactions that often involve primary pollutants Ozone is the most common example, involving a complex chemical reaction of reactive organic gases (ROG) and nitrogen oxides (NO_x) in the presence of sunlight.

Air quality within the project areas during construction would be a function of the primary pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographical factors influencing the intrusion of pollutants into the area from pollutant sources outside the immediate area. Two types of air pollutant sources must be considered with respect to the proposed project. stationary sources and mobile sources. Stationary sources include on-site emissions during the various aspects of project construction. Mobile sources include construction equipment and vehicle emissions during the construction phase. Construction emissions are generally considered to be short-term emissions, lasting only for the duration of construction.

Dam construction produces three types of air contaminants exhaust emissions from vehicles and construction equipment, smoke from burning during reservoir clearing and grubbing, and fugitive dust generated by various construction activities, including vehicle travel on unpaved roads, quarrying, blasting, aggregate preparation, and other forms of soil movement.

STANDARDS OF SIGNIFICANCE

Impacts of project construction would be considered short-term impacts, lasting for the duration of construction, or from 21 to 36 months. A project would normally have a significant adverse impact on air quality if it were to result in a violation of federal or state air quality standards, if it would violate any MBUAPCD standards, or expose sensitive receptors to substantial air pollutant concentrations.

11.3.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

Impact

11.3.1-1 Construction of the 24 NLP project would result in significant air pollutant exhaust emissions generated by vehicles and construction equipment.

Vehicular and construction equipment exhaust emissions are generated by a variety of gasoline and/or diesel-powered equipment. Exhaust emissions would include those associated with the transport of workers, machinery, and supplies to the project site, as well as those produced on-site by the equipment used for foundation excavation, drilling, quarrying, aggregate and RCC concrete mix preparation, vegetation clearing, and road construction.

Table 4-1 lists the projected on-site equipment necessary during the construction of the project. Appendix 11-C presents construction information, for each of the different alternatives, on acres to be cleared, trip lengths and volumes of materials to be moved. The major material deliveries expected during the course of construction are described in Chapter 10. These categories are combined to give an average number of truck loads per day. The estimated exhaust emissions from off-site travel are shown in Table 11-3.

By combining the haul distance with the number of cubic yards to be hauled, for example, the number of miles travelled by dump trucks can be calculated. This result is then broken down into miles travelled on paved or unpaved roads. The results of this analysis for exhaust emissions from on-site equipment are shown in Table 11-3. Off-site exhaust emissions would consist of the delivery of construction materials and equipment, and employee travel to the work site. It is unknown at this time how many employees would stay on-site in work camps or trailers during construction.

TABLE 11-3

CALCULATION OF OFF-SITE VEHICLE EMISSIONS AND ON-SITE CONSTRUCTION EQUIPMENT

Off-Site Vehicle Emissions[1]

	Car		Truck				
Alternative	Round Trip Miles	Number Per Day	Round Trip Miles	Number Per Day	ROG	CO (Tons Per Day)	NO_x
24 NLP	56	100	122	15	0.0099	0.0804	0.0400
16 NLP/D	56	100	122	15	0.0099	0.0804	0.0400
9 NLP/D	56	100	122	15	0.0099	0.0804	0.0400
23 NSC	44	100	90	15	0.0075	0.0624	0.0299
6 CAC/D	60	100	114	1	0.0051	0.0710	0.0097
11 SCC	46	100	92	15	0.0078	0.0647	0.0306
10 CHU	48	100	94	1	0.0042	0.0568	0.0077
25 CAN	18	100	80	320	0.1287	1.0452	0.5200

On-Site Construction Equipment Emissions[2]

Alternative	CO	HC	NO_x	SO_x	Part
24 NLP	0.077	0.021	0.272	0.029	0.023
16 NLP/D	0.065	0.018	0.230	0.024	0.020
9 NLP/D	0.047	0.013	0.167	0.018	0.014
23 NSC	0.059	0.016	0.209	0.022	0.018
6 CAC/D	0.077	0.021	0.272	0.029	0.023
11 SCC	0.071	0.019	0.251	0.026	0.022
10 CHU	0.124	0.034	0.439	0.046	0.038
25 CAN	0.673	0.182	2.383	0.251	0.205

[1] Emission factors calculated by MBUAPCD staff using EMFAC7D guidelines. For employees and visitors it was assumed to be a 60-mile round-trip. For heavy duty diesel trucks delivering construction materials, it was assumed to be 110 miles round-trip. For diesel trucks 30-minute idle time was assumed, with idle emission factors from MBUAPCD. Assumes two employees per vehicle.

[2] The emission factors for heavy duty diesel equipment were calculated by averaging the values presented in EMFAC7C Table II-7.1 for the various types of equipment. The MPWMD engineering consultants estimated that the on-site equipment would total about 5,000 hp maximum total output, while a reasonable estimate of the actual total output would be about 60 percent of the rated output, or about 3,000 hp. Assuming an eight-hour day, the brake specific horsepower per day would be 24,000 hphr This figure is multiplied by the emission factor to yield the emissions by type per day during the construction period. The emissions were first calculated based on equipment used in the construction of the 23 NSC alternative These emissions were then adjusted based on the relative volumes of materials hauled to arrive at emissions for the other alternatives, (see Notes to Table 11-6).

Source: MPWMD

For the purposes of this analysis, it is assumed that all workers will commute to the site daily. It is estimated that about 110 persons per shift would travel to and from the site, not including suppliers representatives, civic leaders and government agency personnel, and visitors.

Air pollutant exhaust emissions generated by vehicles and construction equipment would result in a short-term significant adverse air quality impact. The following mitigation measures are recommended to lessen the air quality impacts from this source of air pollution.

Mitigation Measures

11.3.1-1 *The potential air quality impacts from vehicle and construction equipment emissions would be reduced by the implementation of the mitigation measures detailed below:*

a.) Off-site exhaust emissions from material deliveries would be reduced by the contractor selecting trucking firms that have an active exhaust inspection and maintenance program.

b.) On-site emissions would be reduced by minimizing idling time for all heavy equipment and frequent exhaust system inspections and maintenance. Facilities would be established to perform on-site maintenance of all vehicles and equipment.

c.) Off-site exhaust emissions from employee commuting would be reduced in the following ways:

- *The contractor could establish a work camp at the project site, particularly for the more remote sites such as New Los Padres and Cachagua Creek.*

- *Carpooling for employees could be required such that there would be at least two persons per vehicle.*

- *The MPWMD would coordinate with Monterey County to establish a staging location from which workers would be transported by bus Potential locations would be Carmel Valley Road at Los Laureles Road, and Highway 68 at Los Laureles Road. After the completion of construction, the parking site could become a park and ride facility. Alternatively, the contractor could lease existing unused parking space from private individuals, such as in Carmel Rancho Shopping Center or Del Monte Center. Either of these methods would greatly reduce the traffic and emissions impacts. It is estimated that transporting the workers by bus from a central staging area could reduce off-site vehicle exhaust emissions by at least 50 percent.*

Implementation of these mitigation measures would lessen the air quality impacts of project construction, but the impact would remain significant and unavoidable.

Impact

11.3.1-2 **Construction or the 24,000 AF New Los Padres project would result in significant air pollutant emissions generated by smoke from burning during reservoir clearing and grubbing.**

Construction of a dam necessitates the clearing of substantial amounts of vegetation. This is necessary for road construction, clearing of the foundation and quarry areas, siting of the aggregate crushing plant and concrete batch plant, equipment storage and warehousing. In addition, the reservoir inundation area would be cleared to reduce the formation potential of trihalomethanes (THMs). THMs are organic chemicals formed when water containing organic matter is chlorinated, these chlorinated organic chemicals are thought to be carcinogenic. As a result, the acreages shown in Appendix 11-D for each alternative would need to be cleared. While each dam and reservoir location is different to some degree in the type and amount of vegetation to be cleared, in general there are small areas of riparian trees and shrubs and larger areas of oak tree and chaparral communities. Burning of vegetation would greatly reduce the amount of time and energy necessary, as compared with other techniques of vegetation removal. However, as discussed below, there are a number of other factors that must be considered such as the effect of burning on air quality.

If burning was selected as the method of vegetation removal, permits for this action would be required from the California Department of Forestry and the MBUAPCD. This would require the submittal of a detailed plan that must address site preparation, weather conditions, fuel moisture, smoke management, and other factors. Each of the alternative dam sites are located in "extreme" fire hazard areas due to a combination of average daily temperatures, humidity, terrain, and fuels.[4]

MBUAPCD Rule 422 requires a minimum o0 day drying time for wood wastes prior to burning, and prohibits burning from April through December. Dam site and reservoir areas would be cleared and the spoils placed in large piles surrounded by adequate firebreaks. Materials would

be allowed to dry sufficiently to create efficient combustion. Ashes and non-combustibles would be buried beneath fill in the reservoir area.

A review of the literature regarding smoke generated from wood waste burning indicates a number of potentially significant impacts. First, poison oak is an extremely common component of oak woodland under story, and when burned is known to produce toxic smoke. Second, the combustion products of wood waste include carbon monoxide (CO), oxidants such as ozone, a diverse range of hydrocarbons (HC), and particulates.[5] Emissions and combustion products vary widely depending upon fire behavior and fuel conditions. Each of the major combustion products is discussed in more detail below.

Carbon monoxide is the most abundant air pollutant from forest fire or wood waste burning. It may be a direct hazard to human health depending on duration, concentration, and the level of physical activity during exposure. Concentrations as high as 200 ppm have been measured close to flames, but these levels were reduced to less than 10 ppm within 100 feet of the fire.[6] CO yields have been reported in the range of 35 to 195 pounds per ton of fuel burned, with rates as much as 500 pounds per ton from smoldering damp fuels.[7]

Smoke produced by burning agricultural wastes contains minor amounts of constituents that react in sunlight to form photochemical smog, typified by ozone concentrations several times higher than the ambient background level of 0.03 ppm.[8] Radke et al (1978) measured ozone concentrations of up to 0.9 ppm in plumes from broadcast slash burning.[9]

Hydrocarbons are an extremely diverse class of compounds containing hydrogen, carbon, and sometimes oxygen. Air quality standards and emissions inventories usually lump all gaseous HC's together, although the majority of HC pollutants may have no harmful effect.[10] On the other hand, trace constituents may be the most important constituents to photochemical smog production and affecting human health. There are literally hundreds of different organic gases and vapors from fires and this area has only recently begun to be examined. The presence of polynuclear aromatic hydrocarbons (PAH) in the combustion products is well known, however, and one of these, Benzo (a) pyrene (BaP) is a known carcinogen. Total HC's measured range from 10 to 40 pounds per ton of fuel burned.[11]

Particulates are probably the most important combustion product of fires from an emissions perspective. They are the major cause of reduced visibility and may aggravate respiratory conditions in susceptible individuals. Air pollution effects from particulates depends primarily on the sizes of the particles present. Fine particles (less than 3 microns) have a much greater impact on human health then larger ones, and BaP may be associated with the smallest particles from combustion sources.[12,13] Emission rates of particulates depends heavily on fire type, intensity and phase. Emissions per ton of fuel burned are in approximately inverse proportion to fire intensity.[14] For a given fire, emission rates during the smoldering phase can be up to eight times higher than in the flaming phase. Published emission rates range from 4 to 150 pounds per ton of fuel burned (Appendix 11-E).

Appendix 11-F presents a summary of average emission factors suggested for use in emission inventories. Using the factors shown at the bottom of the table, the amount of emissions in each category for each alternative were calculated. These are shown in Table 11-4. It should be noted that these estimates are most likely a worst case, because most of the research done in this field has been on forest fuels, while the fuels involved in reservoir clearing operations would be thoroughly dried and piled up to improve combustion efficiency. The proposed reservoir sites are generally in remote areas which have few residents in the immediate vicinity.

Air pollutant emissions generated by smoke from burning during reservoir clearing and grubbing would result in a short-term significant adverse air quality impact. The following mitigation measures are recommended to lessen the air quality impacts from this source of air pollution.

Mitigation Measures

11.3.1-2 *The potential air quality impacts from smoke generated by burning during reservoir clearing and grubbing would be reduced by the implementation of the mitigation measures detailed below:*

a.) Clear poison oak and under story with goats. Poison oak in the riparian zone and in locations inaccessible to goats or which could not be fenced would be removed by equipment and buried.

b.) All merchantable wood would be harvested and hauled off site for sale.

TABLE 11-4

POTENTIAL EMISSIONS FROM THE BURNING OF VEGETATION CLEARED FROM RESERVOIR AND QUARRY AREA BY ALTERNATIVE

Alternative Location	Inundation Area (Acres)	TSP	CO (Tons)	HC	NO_x
24 NLP	260	75.6	302	56.7	7.6
16 NLP/D	225	54.3	217	40.8	5.5
9 NLP/D	140	33.8	135	25.4	3.4
23 NSC	420	97.9	392	73.4	9.8
6 CAC/D	116	41.4	166	31.1	4.1
11 SCC	340	47.9	192	35.9	4.8
10 CHU	200	27.1	108	20.3	2.7
25 CAN	275	80.0	319	60.0	8.0

Notes:

The following emission factors were used:

TSP:	20 lbs/tons burned
HC:	15 lbs/tons burned
CO:	80 lbs/tons burned
NOX:	2 lbs/tons burned

The amount of tons of fuel for each alternative was calculated using the following fuel loading values for each type of vegetation cover within the area to be cleared. Acreage of the various cover types was determined by EIP Associates.

Grassland	1 tons/acre
Coastal Sage Scrub	6 tons/acre
Oak Woodland	50 tons/acre
Riparian Woodland	30 tons/acre
Chamise Chaparral	25 tons/acre
Mixed Evergreen Forest	40 tons/acre

Average values from Green (1981).

Source: MPWMD

c.) *All slash, small limbs and leaves would be chipped and used as mulch on exposed slopes to promote revegetation and reduce soil erosion and downstream sedimentation impacts.*

d.) *Stumps would be buried in reservoir area beneath at least 10 feet of soil.*

Implementation of these mitigation measures would lessen the effects of burning on air quality, but this impact would remain significant and unavoidable.

Impact

11.3.1-3 **Construction or the 24,000 AF New Los Padres project would result in significant air pollutant emissions from fugitive dust generated by various construction activities.**

Atmospheric dust would be generated by the mechanical disturbance of the land surface in the project area as a result of vegetation clearing, road construction, foundation excavation, and excavation at the quarry sites. In addition, vehicle travel over paved and unpaved roads, hauling from the quarry sites to stockpile locations, movement of material and vehicles at the stockpile sites, processing of aggregate material (sorting, crushing, and screening) and the operation of the concrete batch plant would contribute to dust generation. A portion of the fugitive dust would be entrained in the atmosphere and contribute to increased levels of PM_{10}. Table 11-5 presents the fugitive dust emissions projected for each of the alternatives.

For the sources listed above, dust generation is caused by either the pulverization and abrasion of surface materials by mechanical force such as wheels or blades, or by entrainment of dust particles through turbulent air currents at a speed of 12 miles per hour or greater. The impact of fugitive dust on ambient air quality depends upon the quantity of dust particles and their drift potential, which is related to particle size. For example, large dust particles generally settle out close to their source while finer particles can be dispersed over much greater distances.

The potential drift distance of a dust particle depends on the initial injection height of the particle, its settling velocity, and the degree of atmospheric turbulence. Emission factors for fugitive dust include only those particles smaller than 30 microns. Particles larger than 30 microns settle out

TABLE 11-5

SUMMARY OF FUGITIVE DUST SOURCES BY ALTERNATIVE
(Tons/Day)

	Paved Road		Unpaved Road		Batch Plant		Processing Plant		Total Dust Emissions	
Alternative	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP
24 NLP	0.059	0.166	0.048	4.238	1.526	0.978	0.282	0.154	1.915	5.605
16 NLP/D	0.059	0.166	0.048	4.238	1.526	0.815	0.235	0.125	1.867	5.378
9 NLP/D	0.059	0.166	0.048	4.238	1.526	0.652	0.187	0.095	1.820	5.151
23 NSC	0.026	0.069	0.097	2.825	1.017	0.739	0.214	0.154	1.354	3.787
6 CAC/D	0 046	0.130	0.221	2.472	0.890	0.579	0.164	NA	1.321	3.181
11 SCC	0.026	0.069	0.097	2.472	0.892	0.856	0.238	0.170	1.253	3.567
10 CHU	0.023	0.063	0.247	7.062	2.543	0.935	0.264	NA	3.077	8.060
25 CAN	0.009	0.024	NA	2.472	0.890	NA	NA	NA	0.899	2.496

Source: MPWMD

within a few hundred feet of the source and, as such, create more of a local nuisance problem than an impact on ambient air quality. Emission factors are presented for both TSP and PM_{10}. The quantity of dust emissions primarily depends on the particle size, moisture content of the material, and atmospheric conditions. Each major potential source of fugitive dust is discussed below.

Paved Roads. Dust emissions from paved roads are a major source of particulate matter, primarily due to the large number of vehicles travelling over them. The emission factors are small (pounds per vehicle mile travelled, VMT) but the sheer number of vehicles makes this by far the largest source for TSP and PM_{10}. In the 1987 emissions inventory for the NCCAB prepared by the MBUAPCD, entrained paved road dust was estimated to comprise 57 percent of the total TSP emissions, and 45 percent of the PM_{10} emissions.

A distinction must be made between the paved roads travelled to the project sites, and those paved roads within or immediately adjacent to the construction areas. Dust emissions from industrial paved roads have been found to be a major component of atmospheric particulates in the vicinity of these operations. This is due to vehicles entering from unpaved roads tracking or depositing dust on the roadway, vehicle travel on the shoulder of the road for passing, and spilled material. Dust emissions from paved roads near construction sites depends upon the fraction of silt in the surface material, the amount of surface dust loading, the number of traffic lanes, and the weight of the vehicles For light duty trucks, for example, TSP emissions were about 10 times higher on paved roads near the construction site as compared to normal road travel. Appendix 11-G presents paved road emission factor for PM_{10} for normal roads away from the construction site roads. Appendix 11-H shows calculations of dust emissions for on-site paved roads for all project alternatives based upon estimates of the miles of paved roadway in or adjacent to the project site and the VMT.

Unpaved Roads. The amount of dust emissions from unpaved temporary construction roads is much higher per VMT than from paved roads. Unpaved roads during dam construction would exist in the vicinity of the quarries, along the haul route to the aggregate processing site and waste material deposition, and during the reservoir clearing and foundation excavation phases. The emission factors and calculations of the fugitive dust for each alternative are shown in Appendix 11-H and Appendix 11-I.

Aggregate Processing. A large volume of aggregate is necessary for the construction of a RCC dam. Aggregate processing involves the following operations: quarrying or excavation, loading, unloading, screening, crushing, and load out to either a stockpile or the next phase of the construction operation such as a concrete batch plant. Uncontrolled construction aggregate processing can result in significant levels of particulate emissions. If the materials are wet or moist, process emissions are often negligible. When dry materials are involved emissions are generally at least 10 times greater. Rock crushing also tends to produce more dust as compared to screening and sorting. Aggregate storage piles may also contribute dust emissions as a result of loading and unloading and disturbance by strong wind currents. The movement of vehicles in the stockpile area may also contribute substantial amounts of dust. Emission factors are shown in Appendix 11-J for the various components of aggregate processing, while the estimates of emissions are presented in Appendix 11-K for the various project alternatives. Major differences exist between projects due to the large variation in the amount of aggregate needed for each.

Concrete Batch Plants. Construction of the New Los Padres Dam would necessitate the construction of a large concrete batch plant capable of producing 100 cubic yards of RCC per hour. During the actual construction of the dam, RCC production would occur continuously. Emissions during the preparation of the RCC would consist primarily of cement dust, although loading of sand and aggregate, vehicle traffic, and wind erosion from stockpiles would contribute some dust. Uncontrolled particulate emissions from the entire process has been estimated at 0.20 pounds per cubic yard of concrete. Appendix 11-K presents the amount of fugitive dust from this phase of the construction for each alternative.

Air pollutant emissions from fugitive dust generated by various construction activities would result in a short-term significant adverse air quality impact. The following mitigation measures are recommended to lessen the air quality impacts from this source of air pollution. Appendix 11-L presents estimates on emission reduction based upon Mitigation Measures 11.3.1-3.

Mitigation Measures

11.3.1-3 *A carefully coordinated program of dust abatement would reduce potential impacts to a level of insignificance. Appendix 11-L presents estimates on emission reduction based upon the following mitigations.*

a) *A dust abatement officer would be on-site during all construction phases. The officer would be responsible for inspecting sources of fugitive dust and coordinating control measures. Two water trucks and a vacuum road sweeper would be available at the site.*

b) *Little can be done about fugitive dust generated off-site by travel over paved surfaces. However, for those paved roads on-site, there would be a periodic washing and sweeping of the roadways, and all trucks hauling soil would be covered with tarps prior to leaving the project site. Truck beds would be hosed down to reduce soil spillage on paved roads.*

c) *Temporary construction roads would be re-wetted frequently with water to maintain the dust control efficiency. Chemical stabilizers would not be used due to potential off-site impacts on water quality and plant and animal life.*

d) *For aggregate processing, wet suppression techniques involving spray systems at conveyor feed and discharge points, transfer points, and around storage piles would be used to reduce emissions from 70 to 90 percent (Jutze and Axetell 1974). For long-term aggregate storage, the application of chemical wetting agents would be used to reduce particulate emissions up to 90 percent.*

e) *Controls to be used during operation of the concrete batch plant include water sprays, enclosures, hoods, and movable and telescoping chutes. Dust generated by vehicle movement around the aggregate and concrete batch plant areas would be reduced by watering all surfaces a minimum of several times per day, depending on how quickly the surface dries which is in turn dependent upon the daily temperatures.*

Implementation of these mitigation measures would lessen the air quality impacts of project construction, but the impact would remain significant and unavoidable.

Impact

11.3.1-4 **Secondary impacts would result from the formation of ozone by ozone precursors emitted at the construction site in the burning of fossil fuels related to transportation, operation of equipment and clearing of vegetation.**

Secondary impacts would include the formation of ozone (O_3) which occurs through a complex reaction of various precursors in the presence of sunlight. Nitrogen oxides (NO_x) and reactive organic compounds (ROG) are considered to be the primary pollutants contributing to the

formation of ozone.[15] There is no methodology currently available to predict the amount of ozone that would be formed from given levels of precursor pollutants. The NCCAB is estimated to produce 98.8 tons of ROG on an average summer weekday. Ozone levels as high as 0.11 ppm have been recorded concurrently with ROG estimates. Short-term and long-term emissions of ROG would translate to 0.01 percent of the 1987 inventory estimate. Assuming a direct correlation of ROG to ozone, the emissions from the proposed project would represent a 0.01 percent increase in the ozone levels of the NCCAB. This is considered an insignificant increase.

Mitigation Measures

11.3.1-4 *None necessary.*

11.3.2 16,000 AF NEW LOS PADRES/DESALINATION (16 NLP/D)

Impacts

11.3.2-1 Construction of the 16 NLP/D alternative would result in increased emission of air pollutants.

The air quality impacts discussed in Section 11.3.1, for the 24 NLP alternative, would also be applicable for the construction of the 16 NLP/D alternative, although the air quality impacts of the 16 NLP/D alternative would be of a slightly shorter duration due to the smaller dam size. Construction of the 3 MGD desalination plant would result in additional air quality impacts which will be assessed in a separate environmental document.

Mitigation Measures

11.3.2-1 *See Mitigation Measures 11.3.1-1 through 11.3.1-3.*

11.3.3 9,000 AF NEW LOS PADRES/DESALINATION (9 NLP/D)

Impacts

11.3.3-1 Construction of the 9 NLP/D alternative would result in increased emission of air pollutants.

The air quality impacts discussed in Section 11.3.1, for the 24 NLP alternative, would also be applicable for the construction of the 9 NLP/D alternative, although the air quality impacts of the 9 NLP/D alternative would be of a shorter duration Construction of the 3 MGD desalination

plant would result in additional air quality impacts which will be assessed in a separate environmental document.

Mitigation Measures

11.3.3-1 *See Mitigation Measures 11.3.1-1 through 11.3.1-3.*

11.3.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

Impacts

11.3.4-1 **Construction of the 23 NSC alternative would result in increased emissions of air pollutants.**

The air quality impacts for the 23 NSC alternative would be similar to those discussed for the 24 NLP alternative (See Impacts 11 3.1-1 through 11.3 1-4). The Sleepy Hollow residential subdivision, located in close proximity to the construction site, would be affected by the emission of primary air pollutants. The nearest sensitive receptor to the construction site is a single-family residence approximately 2,250 feet to the north of the construction site.

Mitigation Measures

12 3.4-1 *See Mitigation Measures 11 3 1-1 through 11.3.1-3.*

11.3.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

Impacts

11 3.5-1 **Construction of the 6 CAC/D alternative would result in increased emissions or air pollutants.**

The air quality impacts for the 6 CAC/D Alternative would be similar to those discussed for the 24 NLP alternative, although of shorter duration. (See Impacts 11 3 1-1 and 11.3.1-4). The nearest sensitive receptor to the construction site is a single-family residence approximately 1,250 feet to the west of the site. In Cachagua Valley several hundred people live upwind of the construction site. Given the terrain and dominant wind direction, it is likely that air pollutants emitted at the construction site would be funneled into that area.

Mitigation Measures

11.3.5-1 *See Mitigation Measures 11.3.1-1 through 11.3.1-3.*

11.3.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

Impacts

11.3.6-1 **Construction of the 11 SCC alternative would result in increased emissions of air pollutants.**

The air quality impacts for the 11 SCC Alternative would be similar to those discussed for the 24 NLP alternative, although of shorter duration. (See Impacts 11.3.1-1 through 11.3.1-4). The nearest sensitive receptor to the construction site is a single-family residence approximately 4,500 feet to the north-east of the site.

Mitigation Measures

11.3.6-1 *See Mitigation Measures 11.3.1-1 through 11.3.1-3.*

11.3.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

Impacts

11.3.7-1 **Construction of the 10 CHU alternative would result in increased emissions of air pollutants.**

The air quality impacts for the 10 CHU Alternative would be similar to those discussed for the 24 NLP Alternative, although of shorter duration. (See Impacts 11.3.1-1 through 11.3.1-4). The nearest sensitive receptor to the construction site is a single-family residence approximately 1,750 feet to the north-east of the site.

Mitigation Measures

11.3.7-1 *See Mitigation Measures 11.3.1-1 through 11.3.1-3*

11.3.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

Impacts

11.3.8-1 **Construction of the 25 CAN alternative would result in increased emissions of air pollutants.**

The air quality impacts for the 25 CAN Alternative would be similar to those discussed for the 24 NLP Alternative. (See Impacts 11.3.1-1 through 11.3.1-4). The nearest sensitive receptor to the construction site is a single-family residence approximately 2,500 feet from the site.

Mitigation Measures

11.3.8-1 *See Mitigation Measures 11.3.1-1 through 11.3.1-3.*

11.3.9 7 MGD DESALINATION PLANT (7 DSL)

Impacts

11.3.9-1 **Construction of the 7 MGD desalination plant would result in increased emissions of air pollutants.**

Construction of the 7 MGD desalination plant alternative would result in emission of air pollutants during the construction phase at one of the two sites selected for further review. This alternative may or may not result in a significant air quality impact based on the nature of the construction activity and its proximity to sensitive receptors. The significance of this impact will be determined by subsequent environmental review.

Mitigation Measures

11.3.9-1 *None necessary at this level of analysis.*

11.3.10 NO PROJECT (NO PRJ)

There would be no construction-related air quality impacts associated with the No Project alternative.

11.4 SUMMARY

Table 11-3 through 11-5, and supporting appendices, indicate the amount of air pollutant emissions expected during the construction phases for the various alternatives in a major water supply project. It must be remembered that these estimates are for uncontrolled operations; the mitigation measures for these potential air quality impacts are described above. Table 11-6 summarizes the potential air quality impacts of each alternative by pollutant during the short-term or construction period.

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1.) Bechtel, Preliminary Designs and Cost Estimates for the New Los Padres, New San Clemente, and San Clemente Creek Projects, 1989.

2.) G.A. Jutze, and K. Axetell, Investigation of Fugitive Dust, Volume I: Sources, Emissions, and Control, EPA 450/3-74-036a, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1974.

3.) O.D. Knipe, Angora Goats for Conversion of Arizona Chaparral: Early Results, USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, Gen. Tech. Report PSW-58, Berkeley, CA, 1981.

TABLE 11-6

SUMMARY OF POTENTIAL SHORT-TERM PRIMARY IMPACTS[1]

Alternative	ROG	CO	HC	(Tons/Day) NOx	SOx	TSP	PM_{10}
24 NLP	0.0099	1.84	0.429	0.354	0.029	5.605	1.915
16 NLP/D	0.0099	1.35	0.243	0.280	0.022	5.378	1.867
9 NLP/D	0.0099	0.88	0.155	0.234	0.018	5.151	1.820
23 NSC	0.0075	2.30	0.424	0.293	0.022	3.787	1.354
6 CAC/D	0.0017	1.07	0.194	0.304	0.029	3.181	1.321
11 SCC	0.0078	1.20	0.219	0.281	0.026	3.567	1.253
10 CHU	0.0042	0.78	0.146	0.462	0.046	8.060	3.077
25 CAN	0.0017	3.41	0.346	0.773	0.022	2.496	0.899

[1] Desalination is not sufficiently defined to allow the calculation of construction-related air quality impacts.

Notes:

Potential emissions from the burning of vegetation during clearing operation shown in Table 11-4 were divided by 180 days to obtain a tons/day value for the period of time in which burning would occur.

Heavy equipment emissions derived in Table 11-3 were adjusted by a factor that was calculated from the relative volumes of material hauled for a given project compared to the New San Clemente alternative for which the original equipment estimates were made. Volume estimates are shown in Appendix 11-C.

Alternative	Factor
24 NLP	1.3
16 NLP/D	1.1
9 NLP/D	0.8
23 NSC	1.0
6 CAC/D	1.3
11 SCC	1.2
10 CHU	2.1
25 CAN	11.4

Source: MPWMD

1. MBUAPCD, Air Quality Management Plan, Salinas, CA, 1989.

2. Ibid.

3. S. Gregory, and K. Smith, Local Temperature and Humidity Contrasts Around Small Lakes and Reservoirs, December 1967.

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6. P.W. Ryan, Quantity and Quality of Smoke produced by Southern Fuels in Prescribed Burning Operations, Proc. of the Natl. Conf. on Fire and Forestry Meteorol., April 2-4, 1974, Lake Tahoe, CA, 1974.

7. P.W. Ryan, and C.K. McMahon, Some Chemical and Physical Characteristics of Emissions from Forest Fires, Paper presented at 69th Annual Meeting of the Air Pollution Control Assoc., Portland, OR, 1976.

8. D.V. Sandberg, op. cit.

9. L.F. Radke, J.L. Stith, D.A. Hegg, and P.V. Hobbs, Airborne Studies of Particles and Gases from Forest Fires, J. Air Pollution Control Assoc., 28(1):30-34, 1978.

10. D.V. Sandberg, op. cit.

11. P.W. Ryan, and C.K. McMahon, op. cit.

12. J.K. Burchard, Significance of Particulate Emissions, J. Air Pollution Control Assoc., 25(2):99-100, 1975.

13. P.W. Ryan, and C.K. McMahon, 1976, op. cit.

14. D.V. Sandberg, 1974, op. cit

15 MBUAPCD, 1989, op. cit.

12. NOISE

12.1 SETTING

12.1.1 INTRODUCTION

Environmental noise is measured in decibels (dB). The A-weighted decibel (dBA), refers to a scale of noise measurement which approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 3 dBA to about 140 dBA. A 10 dBA increase in the level of a continuous noise represents a perceived doubling of loudness; a 3 dBA increase is just noticeable to most people.

Human response to noise is subjective, and varies considerably from individual to individual. The effects of noise can range from interference with sleep, concentration, and communication, to physiological and psychological stress, and, at the highest levels, to hearing loss. The sound level of speech is typically about 60 to 65 dBA. Sleep disturbance occurs when interior noise levels exceed 40 to 50 dBA.

Environmental noise fluctuates in intensity over time and several descriptors of time-averaged noise levels are in use. The three most commonly used are L_{eq}, L_{dn}, and CNEL. L_{eq}, the energy equivalent noise level, is a measure of the average energy content (intensity) of noise over any given period of time. L_{dn}, the day-night average noise level, is the 24-hour average of the noise intensity, with a 10 dBA "penalty" added for nighttime noise (10.00 pm to 7.00 am) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn}, but adds an additional 5 dBA penalty to evening noise (7:00 pm to 10.00 pm). In situations where vehicles are the dominant source of noise, L_{eq} for the peak commute hour, L_{dn} and CNEL of the same noise source usually differ by less than 2 dBA.

12.1.2 REGULATORY BACKGROUND

State of California

The California Department of Health Services (DHS) Office of Noise Control has studied the correlation of noise levels and their disruptive effects. As a result, the DHS has established four categories for judging the severity of noise intrusion on specified land uses. Noise in the "normally acceptable" range places no undue burden on affected receptors and would need no mitigation. As noise levels rise into the "conditionally acceptable" range, some mitigation of exposure, as established by an acoustic study, would be warranted. At the next level, noise intrusion is so severe that it is classified "normally unacceptable" and would require extraordinary mitigation measures to avoid disruption. Finally, noise in the "clearly unacceptable" range is so severe that it cannot be mitigated. The State uses L_{dn} or CNEL interchangeably to measure noise exposure.

Monterey County

The County of Monterey has adopted noise guidelines as part of the Noise Element of its General Plan, presented in Table 12-1. The Monterey County noise element identifies outdoor noise levels that are appropriate for various activities. For example, outdoor levels up to L_{dn} 50 to 55 dBA would be "normally acceptable" for single family low-density residential land uses, while levels of L_{dn} 50 to 70 dBA would be "normally acceptable" for industrial, manufacturing, utilities and agriculture.

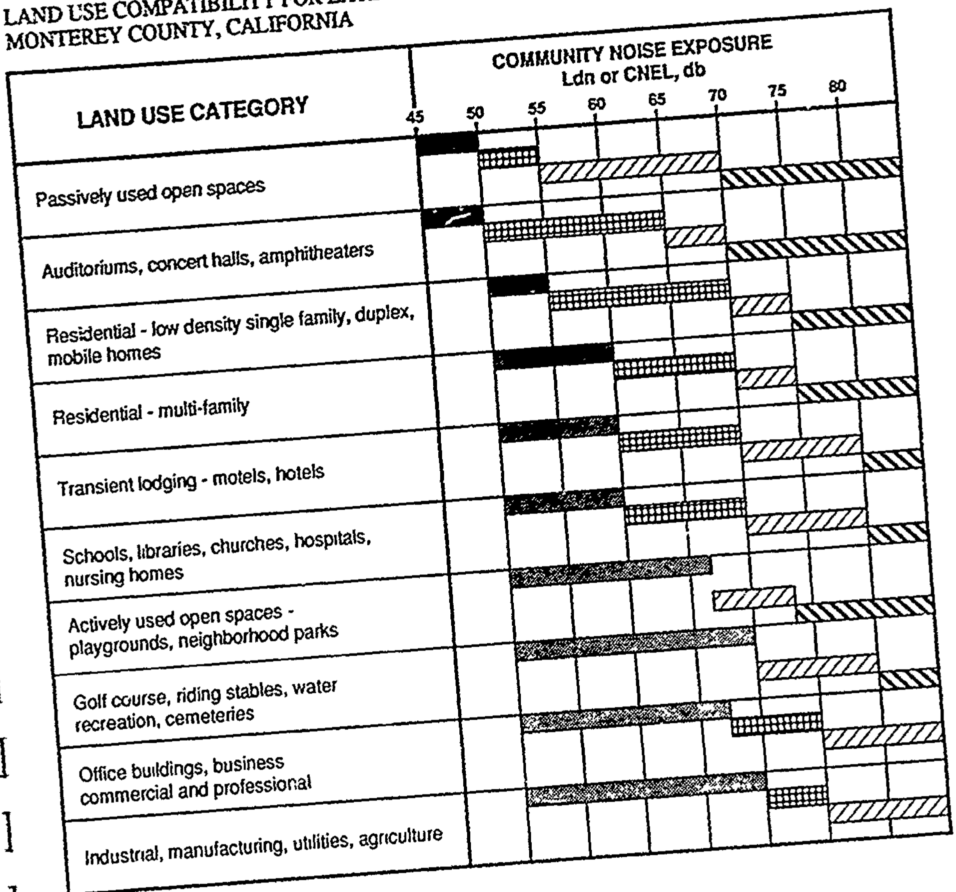
12.1.3 NOISE LEVELS AT THE PROJECT SITES

The proposed project alternatives would affect noise levels near the dam sites and near roads that would be used by construction traffic. Noise levels measured in the vicinity of the San Clemente Dam, assumed to reflect the ambient noise levels at other alternative sites, indicates L_{eq}'s ranging from 28 to 57 dBA.[1]

Existing noise levels close to Carmel Valley Road were calculated using the Federal Highway Administration's STAMINA 2.0 Noise Prediction Model. Calculated noise levels are shown in Table 12-2. They are based on the average daily traffic volumes shown in Table 10-1. From State Highway 1 to Carmel Valley Village, noise levels 100 feet from the highway centerline are estimated to be in the range of 60 to 70 decibels. Corresponding estimated noise levels for the

Table 12-1

LAND USE COMPATIBILITY FOR EXTERIOR COMMUNITY NOISE FOR MONTEREY COUNTY, CALIFORNIA



NOISE RANGE I -- NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Indoor and outdoor will be pleasant

NOISE RANGE II -- CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice

NOISE RANGE III -- NORMALLY UNACCEPTABLE
New construction or development should be generally discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

NOISE RANGE IV -- CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken

Source: Office on Noise Control, California Department of Health, 1976

lightly-travelled section of Carmel Valley Road near the proposed project site are in the range of 50 to 60 decibels.

12.2 IMPACTS OF PROJECT OPERATION

STANDARDS OF SIGNIFICANCE

CEQA Guidelines indicate that a project would normally result in a significant adverse impact if it caused a substantial increase in the ambient noise level in areas sensitive to noise adjacent to the project site. The potential for significant impacts also exists where land use compatibility standards for community noise, as defined by the State of California and adopted by the County of Monterey, are exceeded.

12.2.1 RESERVOIR ALTERNATIVES

Impact

12.2.1-1 **Operation of each of the proposed reservoir alternatives would result in a slight increase in noise in the vicinity of the dam sites and along transportation corridors accessing the sites.**

Noise levels in the vicinity of the proposed project alternatives would be basically unaffected by the operation of the new facilities. The facilities are remote from any sensitive receptors and little or no noise would be generated by reservoir operation. Additionally, increased traffic resulting from maintenance and operation of the proposed projects would result in an unmeasurable increase in traffic noise. This impact would be considered insignificant.

Mitigation Measure

12.2.1-1 None necessary.

12.2.2 DESALINATION ALTERNATIVES

Impact

12.2.2-1 **Operation of a desalination plant could result in a potentially significant increase in ambient noise levels in the vicinity of the project site.**

TABLE 12-2

PREDICTED NOISE LEVELS ALONG CARMEL VALLEY ROAD
DURING PROJECT CONSTRUCTION

Road Segment	Noise Level 100 Feet from Roadway Centerline in Decibels	
	Existing	During Construction
Highway 1		
North of Carmel Valley Road	76	76
South of Carmel Valley Road	73	73
Carmel Valley Road		
Highway 1 to Carmel Rancho Boulevard	72	72
Carmel Rancho Boulevard to Rio Road	73	73
Rio Road to Rancho San Carlos Road	71	72
Rancho San Carlos Road to Schulte Road	71	71
Schulte Road to Robinson Canyon Road	70	70
Robinson Canyon Road to Laureles Grade	69	69
Laureles Grade to Ford Road	68	68
Ford Road to Esquiline Road	66	66
Esquiline Road to Cachagua Road	60	61
Cachagua Road to Martin Road	56	58
Laureles Grade		
North of Carmel Valley Road	64	65
South of Highway 68	65	65
Cachagua Road		
Tassajara Road to Carmel Valley Road	54	57

Note Noise volumes calculated using Peak Hour Volumes from Table 10-1, assuming a fleet mix of 80 percent cars, 15 percent medium weight trucks and 5 percent heavy weight trucks

Source EIP Associates

Ambient noise levels in the vicinity of a desalination plant could be increased during the operation of the new facilities. Noise generated by a desalination plant would likely consist of a continuous mechanical noise generated by the operation of pumps and other equipment. Depending on the type of equipment selected and the project design, noise levels from the operating plant would be potentially significant. This potential impact at the Moss Landing and Marina sites will be evaluated in a separate environmental document.

Mitigation Measure

12.2.2-1 *The desalination plant shall be acoustically designed so that noise levels generated by the operation of the plant do not exceed designated land use compatibility standards (identified in Table 12-1) for land uses that border the site. This would reduce the potential impacts to a less than significant level.*

12.2.3 NO PROJECT ALTERNATIVE

The No Project alternative would not affect ambient noise levels.

12.3 IMPACTS OF PROJECT CONSTRUCTION

STANDARDS OF SIGNIFICANCE

CEQA Guidelines indicate that a project would normally result in a significant adverse impact if it caused a substantial increase in the ambient noise level in sensitive areas adjacent to the project site With regard to construction impacts, those increases in the ambient noise level would be short-term in nature.

The potential for significant impacts also exists where land use compatibility standards for community noise, as defined by the State of California and adopted by the County of Monterey, are exceeded Land use incompatibilities which may arise due to construction noise would only exist during the construction phase

12.3.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

Impacts

12.3.1-1 **During construction, noise levels adjacent to transportation corridors accessing the proposed sites would be elevated as a result of increased construction traffic volumes.**

Off-site construction traffic resulting from the 24 NLP alternative would not substantially increase the ambient noise levels along transportation corridors accessing the site. Table 12-2 shows the estimated noise levels that would be experienced 100 feet from the centerline of Highway 1, Carmel Valley Road, Laureles Grade and Cachagua Road. The estimates were made using the Federal Highway Administration's STAMINA 2.0 Model and are considered to be conservative (i.e., high) estimates of actual noise levels. Noise levels along access routes to the proposed dam sites would increase by 3 dBA or less. A change in noise level of 3 dBA or less is defined as barely noticeable.[2]

There would be one to three shift changes each day during construction. The volume of traffic generated during the shift changes would contribute little to average noise levels; however, individual noisy vehicles could be audible inside adjacent residences and could interfere with sleep.

Although traffic noise impacts resulting from the construction of the 24 NLP alternative would be insignificant, the following mitigation measure would further reduce the level of the impact.

Mitigation Measure

12.3.1-1 *Transportation mitigation measures to reduce the volume of traffic and shift the traffic to off-peak periods would reduce the noise impacts of this alternative (See Chapter 10, Traffic, Mitigation Measures 10.3.1-1).*

Impact

12.3.1-2 **Noise levels near the proposed dam site would be increased by construction activities.**

There would be three principal sources of noise at the 24 NLP alternative construction site: mobile and stationary construction equipment and explosive blasting. Table 12 3 shows the noise levels that might be expected 50 feet from various types of construction equipment In addition to the

TABLE 12-3

TYPICAL CONSTRUCTION EQUIPMENT NOISE (dBA)[1]

Equipment Type	Noise Level at 50 Feet: Without Noise Control	Noise Level at 50 Feet: With Feasible Noise Control[2]
Earthmoving:		
Front Loaders	79	75
Backhoes	85	75
Dozers	80	75
Tractors	80	75
Scrapers	88	80
Graders	85	75
Trucks	91	75
Pavers	89	80
Materials Handling:		
Concrete Mixers	85	75
Concrete Pumps	82	75
Cranes	83	75
Derricks	88	75
Stationary:		
Pumps	76	75
Generators	78	75
Compressors	81	75
Impact:		
Pile Drivers	101	95
Jack Hammers	88	75
Rock Drills	98	80
Pneumatic Tools	86	80
Other:		
Saws	78	75
Vibrators	76	75

[1] Taken from Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, prepared by Bolt, Beranek, and Newman for the U.S. Environmental Protection Agency, December 31, 1971.

[2] Estimated levels obtainable by selecting quieter procedures or machines and implementing noise control features requiring no major redesign or extreme cost.

Source: EIP Associates

equipment shown, a concrete batch plant and a rock crusher would be installed at the site. A concrete batch plant would generate approximately 67 dBA at 150 feet and a rock crusher would generate 74 to 84 dBA at 300 feet. It is estimated that the probable mix of equipment at the dam site would generate a noise level of 30 to 60 dBA at a distance of 4,000 feet, although actual noise levels would probably be lower as a result of terrain shielding. These construction activities would continue through the night during the peak construction period.

Blasting would occur at the aggregate borrow area at a frequency of two or three times each week during the construction phase. The type of blasting that would occur would be similar to that performed at surface mines and quarries. It produces noise and vibration different from traffic or construction equipment noise. Noise due to blasting is sudden, infrequent and variable in level Taking no account of terrain shielding, the momentary blast noise peak that would be experienced 4,000 feet away would be in the range of 102 to 113 dBA. Terrain shielding would lessen actual peak noise by an unknown extent.

It has been determined that there is a strong correlation between the strength of ground vibrations from blasting and the level of community annoyance. Based on the range of charge sizes likely to be used, the range of community response to blasting was estimated.[3] The smallest charges are unlikely to annoy persons more than 1,200 feet from the site. The largest charges would annoy about 20 percent of persons at a distance of 4,000 feet from the site.

Single-family, multi-family and general commercial land uses exist to the north of the project site. The nearest sensitive receptor to the construction site is a single-family residence approximately 1,200 feet to the north of the site. Assuming the rock crushing plant was located near the foundation of the dam and that it operated continuously, the resulting L_{dn} at the closest sensitive receptor would be approximately 78 dBA . Limiting the hours of rock crushing to the daytime would reduce the L_{dn} to 70 dBA (see Table 12-4). While an L_{dn} of 78 dBA is defined as "normally unacceptable" for residential exterior noise in Monterey County (see Table 12 1), an L_{dn} of 70 dBA would be defined as "conditionally acceptable".

Due to the proximity of noise sensitive land uses to the construction areas, significant noise impacts would result from noise generated by on-site construction activities. The following mitigation measures are offered to reduce the extent of these impacts.

TABLE 12-4

NOISE LEVELS AT NEAREST SENSITIVE RECEPTORS

Alternative	Distance to Receptor (ft.)	Rock Crushing 7 a.m - 10 p.m		Rock Crushing Continuous	
		L_{dn}	Land Use Compatibility	L_{dn}	Land Use Compatibility
24 NLP	1,200	70	Conditionally acceptable	78	Normally unacceptable
16 NLP/D	1,200	70	Conditionally acceptable	78	Normally unacceptable
9 NLP/D	1,200	70	Conditionally acceptable	78	Normally unacceptable
23 NSC	2,250	66	Conditionally acceptable	73	Normally unacceptable
6 CAC/D	1,250	70	Conditionally acceptable	78	Normally unacceptable
11 SCC	4,500	66	Conditionally acceptable	73	Normally unacceptable
10 CHU	4,500	63	Conditionally acceptable	67	Conditionally acceptable
25 CAN	2,500	66	Conditionally acceptable	72	Normally unacceptable
7 DSL	Unknown	--	--	--	--

Note: Calculations assume rock crushing plant generates noise levels of 84 dBA at 300 feet from source, ambient noise from 10 p.m. to 7 a.m. is 55 dBA and noise attenuation results in a noise reduction of 6 dBA with each doubling of distance from the source. Land use compatibilities are from the Monterey County Land Use Compatibility for Exterior Community Noise (Table 12-1) for single-family residential land uses.

NA = Not Applicable

Source: EIP Associates

Mitigation Measure

12.3.1-2 *The following mitigation measures would reduce noise impacts during construction from operation of mobile and stationary construction equipment and from blasting.*

a) *Residents within a one mile radius of the blasting site would be given advanced warning of blasting episodes. Blasting episodes could also be announced in the news media.*

b) *Blasting would be performed at the end of the day shift, and no blasting would be allowed at night.*

c) *The borrow site and the site of the concrete batching and rock crushing plant would be selected to minimize noise levels at the nearest sensitive receptor. The rock crushing plant would only be operated during the daylight hours.*

d) *Construction specifications would include a provision requiring adequate mufflers on trucks and other construction equipment.*

Implementation of these mitigation measures would lessen the noise impacts of project construction, but the impact would remain significant and unavoidable.

12.3.2 16,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (16 NLP/D)

Impacts

12.3.2-1 **Construction of the 16 NLP/D alternative would result in increased noise levels in the vicinity of project construction.**

The noise impacts discussed in Section 12.3.1 for the 24 NLP alternative would also be applicable for the construction of the 16 NLP/D alternative, although the noise impacts of the 16 NLP/D alternative would be of a shorter duration. Construction of the 3 MGD desalination plant would result in additional construction noise generated at one of the two sites selected for further review.

Increases in off-site traffic-related construction noise levels would be similar to those discussed for the 24 NLP alternative. Construction crew sizes would likely be the same as for the 24 NLP alternative, however, construction would be of a shorter duration. Proportionately less blasting would be necessary for the project foundation and quarrying than for the 24 NLP alternative.

Mitigation Measures

12.3.2-1 *See Mitigation Measures 12.3.1-1 and 12.3.1-2.*

12.3.3 9,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (9 NLP/D)

Impacts

12.3.3-1 **Construction of the 9 NLP/D alternative would result in increased noise levels in the vicinity of project construction.**

The noise impacts discussed in Section 12.3.1 for the 24 NLP alternative would also be applicable for the construction of the 9 NLP/D alternative, although the noise impacts of the 9 NLP/D alternative would be of a shorter duration. Construction of the 3 MGD desalination plant would result in additional construction noise generated at one of the two sites selected for further review.

Increases in off-site traffic-related construction noise levels would be similar to those discussed for the 24 NLP alternative. Construction crew sizes would likely be the same as for the 24 NLP alternative, however, construction would be of a shorter duration. Proportionately less blasting would be necessary for the project foundation and quarrying than for the 24 NLP alternative.

Mitigation Measures

12.3.3-1 *See Mitigation Measures 12.3.1-1 and 12.3.1-2.*

12.3.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

Impacts

12.3.4-1 **Construction of the 23 NSC alternative would result in increased noise levels in the vicinity of project construction.**

The noise impacts for the 23 NSC alternative would be similar to those discussed for the 24 NLP alternative (See Impacts 12.3.1-1 and 12.3.1-2). The Sleepy Hollow residential subdivision, located in close proximity to the construction site, would be affected by construction noise. The nearest sensitive receptor to the construction site is a single-family residence approximately 2,250 feet to the north of the site. Limiting rock crushing to the daylight hours would reduce the L_{dn} at the nearest sensitive receptor from 73 to 66 dBA (see Table 12-4).

Mitigation Measures

12.3.4-1 *See Mitigation Measures 12.3.1-1 and 12.3.1-2.*

12.3.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

Impacts

12.3.5-1 **Construction of the 6 CAC/D alternative would result in increased noise levels in the vicinity of project construction.**

The noise impacts for the 6 CAC/D Alternative would be similar to those discussed for the 24 NLP alternative, although of shorter duration. (See Impacts 12.3.1-1 and 12.3.1-2). The nearest sensitive receptor to the construction site is a single-family residence approximately 1,250 feet to the west of the site. Limiting rock crushing to the daylight hours would reduce the L_{dn} at the nearest sensitive receptor from 78 to 70 dBA (see Table 12-4). Construction of a 3 MGD desalination plant would result in additional noise generated at one of the two sites selected for further review.

Mitigation Measures

12.3.5-1 *See Mitigation Measures 12.3.1-1 and 12.3.1-2.*

12.3.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

Impacts

12.3.6-1 **Construction of the 11 SCC alternative would result in increased noise levels in the vicinity of project construction.**

The noise impacts for the 11 SCC Alternative would be similar to those discussed for the 24 NLP alternative, although of shorter duration. (See Impacts 12.3.1-1 and 12.3.1-2). The nearest sensitive receptor to the construction site is a single-family residence approximately 4,500 feet to the north-east of the site. Limiting rock crushing to the daylight hours would reduce the L_{dn} at the nearest sensitive receptor from 67 to 63 dBA (see Table 12-4).

Mitigation Measures

12.3.6-1 *See Mitigation Measures 12.3.1-1 and 12.3.1-2*

12.3.7 10,500 AF CHUPINES RESERVOIR (10 CHU)

Impacts

12.3.7-1 **Construction of the 10 CHU alternative would result in increased noise levels in the vicinity of project construction.**

The noise impacts for the 10 CHU Alternative would be similar to those discussed for the 24 NLP Alternative, although of shorter duration. (See Impacts 12.3.1-1 and 12.3.1-2). The nearest sensitive receptor to the construction site is a single-family residence approximately 1,750 feet to the north-east of the site. Limiting rock crushing to the daylight hours would reduce the L_{dn} at the nearest sensitive receptor from 75 to 68 dBA (see Table 12-4).

Mitigation Measures

12.3.7-1 *See Mitigation Measures 12.3.1-1 and 12.3.1-2.*

1..3.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

Impacts

12.3.8-1 **Construct'on of the 25 CAN alternative would result in increased noise levels in the vicinity of project construction.**

The noise impacts for the 25 CAN Alternative would be similar to those discussed for the 24 NLP Alternative. (See Impacts 12.3.1-1 and 12.3.1-2). The nearest sensitive receptor to the construction site is a single-family residence approximately 2,500 feet south of the site. Limiting rock crushing to the daylight hours would reduce the L_{dn} at the nearest sensitive receptor from 72 to 66 dBA (see Table 12-4).

Mitigation Measures

12.3.8-1 *See Mitigation Measures 12.3.1-1 and 12.3.1-2.*

12.3.9 7 MGD DESALINATION PLANT (7 DSL)

Impacts

12.3.9-1 **Construction of the 7 MGD desalination plant would result in an increase in ambient noise levels during construction.**

Construction of the 7 MGD Desalination Plant alternative would result in construction noise generated at one of the two sites selected for further review. This alternative may or may not result in a significant construction noise impact based on the nature of the construction activity and its proximity to sensitive receptors. The significance of this impact will be determined in a separate environmental document.

Mitigation Measures

12.3.9-1 *None necessary at this level of analysis.*

12.3.10 NO PROJECT (NO PRJ)

There would be no construction-related noise impacts associated with the No Project alternative.

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1. Westec Services, Noise Assessment, San Clemente Dam Enlargement, January 1984.

2. Planning Analysis and Development, Draft EIR, Carmel Valley Road Improvement, December 1990.

3. Fidell, Sanford, et al., Community Response to Blasting, J.A.S.A. 74(3), 1983.

13. VISUAL QUALITY

INTRODUCTION

This section of the EIR/S evaluates the existing visual quality of the project sites and environs. It also analyzes the potential visual impacts associated with the proposed project alternatives on the existing visual resources of the area when viewed from public vantages.

Few objective or quantitative standards exist for accurately determining the aesthetic or visual quality of the environment because individuals respond differently to changes in their surroundings. A view considered to be unattractive by one person may be pleasing to another. The evaluation of changes in the visual environment differs to some extent according to the visual sensibility of the observer.

Existing conditions of the project sites were documented during field investigations performed in February, 1991. Photographs were taken to record existing visual quality. Many of the project sites are remote from areas of public view, and would not be visually accessible for many people residing in or travelling through the area.

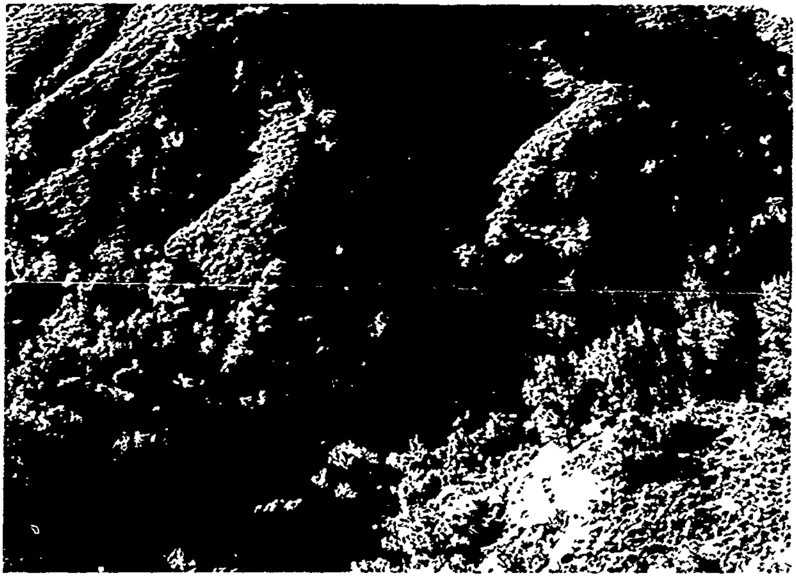
13.1 SETTING

13.1.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

The Carmel River Canyon is a scenic valley characterized by narrow rugged slopes. Dominant visual features include the river and the steep canyon walls. Riparian vegetation is present on stream banks, but has decreased over time in the lower Carmel Valley due to groundwater drawdown and droughts. Until March 1991, the lower Carmel River had been dry for the previous four years. Figure 13-1 shows the existing character of the upper Carmel River Canyon as seen from Cachagua Road.

SITE PHOTO

FIGURE 13-1



Visual character of the Carmel River Canyon as seen from Cachagua Road

SOURCE EIP ASSOCIATES

88069

Visual character of the New Los Padres Dam and Reservoir project area is determined by steeply sloping rugged terrain in this section of the Carmel River Canyon. Dense tree cover on the canyon slopes contributes to the visual character of the canyon. The proposed dam would be located downstream and north of the existing Los Padres Dam and Reservoir, thus inundating the existing facilities.

The proposed dam site is not readily visible to the public due to the rough terrain and difficulty in accessing the site. However, the site is within one-half mile of Prince's Camp, approximately one-half mile to the north, and possibly visible from limited vantages on Cachagua Road. The site is also seen from the Carmel River Trail which skirts the west side of the valley. The Carmel River Canyon can be seen from portions of the Ventana Wilderness and Los Padres National Forest. Rattlesnake Trail in the Ventana Wilderness leads from the uplands to the canyon floor. As the existing inundation area would be enlarged over the current inundation area (to 260 acres), visual change would be noticeable during construction and operation of the 24 NLP alternative.

13.1.2 16,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (16 NLP/D)

The visual character of the 16,000 AF New Los Padres Reservoir site is the same as discussed in Section 13.1.1 for the 24 NLP scenario. The dam would be constructed at the same location; however, the inundation area would cover approximately 225 acres, or about 35 acres less than the previously described 24 NLP alternative.

This option would also include the construction and operation of a desalination plant at either the MRWPCA regional treatment plant site or at the PG&E Moss Landing site. The sites under consideration are both existing utility plant sites, and as such would probably not be affected by the addition of desalination facility structures. If the MRWPCA is selected, radial wells would be drilled along the Monterey Bay coastline, but would be sunk into the ground. The potential visual impacts are being addressed in a separate Desalination Project EIR.

13.1.3 9,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (9 NLP/D)

Visual character of the 9,000-AF New Los Padres Reservoir site is the same as previously described in Sections 13.1.1 and 13.1.2 for the 24 NLP and 16 NLP alternatives. The location of the dam would be the same, although the inundation area would cover approximately 140 acres.

The 9 NLP/D alternative includes the provision of a desalination plant as described above for the 16 NLP/D option.

13.1.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

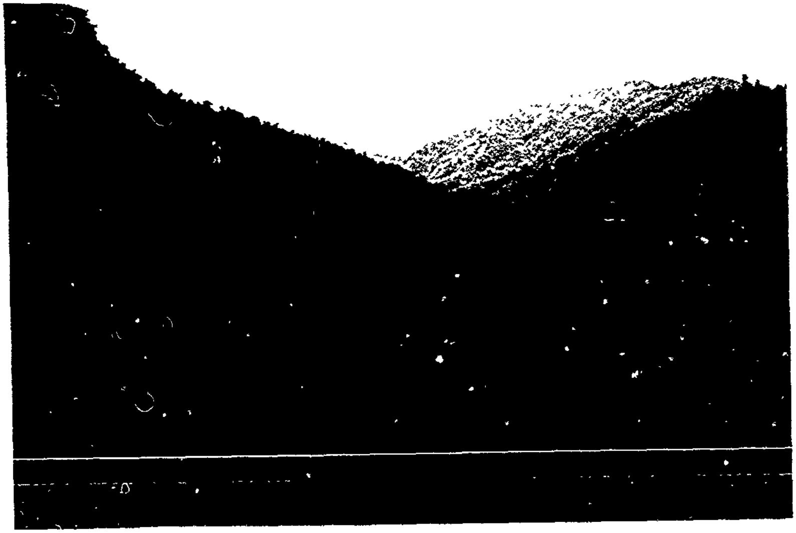
The proposed dam site is located in a steep-sided section of the Carmel River Canyon. The 420-acre reservoir that the dam would create would occupy the Carmel River Canyon itself, and several side canyons formed by the tributary streams. The narrow canyon bottoms are heavily wooded with sycamores and willows. The north-facing canyon slopes are studded with oaks while the south-facing slopes are covered with chaparral. Presently, the most prominent visual feature is the existing San Clemente Dam and the reservoir that it forms. The existing concrete arch dam spans the canyon and includes a steep fish ladder that curves and climbs up the rock face of the canyon wall to the top of the dam.

Because the proposed dam site is located on private property in rugged terrain, and access to the site is controlled, few members of the public ever see it. The project site is not visible from the adjacent Sleepy Hollow residential subdivision. At present, the only views available to the site are from owners of surrounding land parcels and employees of Cal-Am Water Company. Figure 13-2 illustrates the view of the existing arch dam as seen from above and downstream locations.

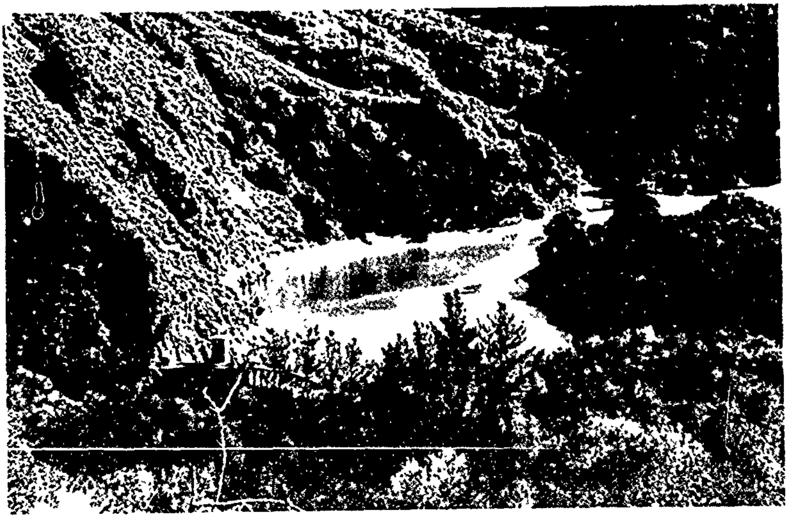
13.1.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

The Cachagua Creek Reservoir site is located along Cachagua Road in a narrow valley spanning the rolling hills. Moderate vegetative cover is present on the steep hillslopes. The vegetation types include chaparral and a mixture of madrone, oak, bay, buckeye and maple trees. The proposed earth fill dam may be visible from sections of the relocated roadway. Inundation areas would follow Cachagua Creek and extend up two tributary creeks. The 116-acre reservoir would be seen from the northernmost road relocation. Few residents live in the area surrounding the proposed project, but Cachagua Road is well travelled and would allow views to project facilities. Figure 13-3 illustrates the existing visual conditions of the dam site as seen from Cachagua Road.

As with the 16 NLP/D and 9 NLP/D alternatives, this option would include the construction and operation of a 3 MGD desalination plant at one of the two alternative sites described in Section 13.1.2.



A. Existing San Clemente arch dam as viewed from downstream.



B. Existing San Clemente Dam and inundation area as seen from above the dam.

SOURCE EIP ASSOCIATES

88069

View of proposed Cachagua Dam site.

SOURCE EIP ASSOCIATES

eip 88089

13.1.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

The proposed roller-compacted concrete dam would be located on San Clemente Creek in a narrow valley between steep slopes. The steep hills are covered with an oak and redwood forest, while the lower portions, near the creek, are dense zones of riparian vegetation.

Approximately 340 acres of land would be inundated with this alternative. The existing San Clemente Dam and Reservoir are located near the SCC site, and are the most visually prominent features in the area. The project would also include the construction of a pumping plant and 54-inch pipeline between the existing and proposed reservoirs.

Access to the area is limited, and direct visual access is difficult except from hiking trails in the area. The San Clemente Trail is within approximately 1,200 feet of the proposed inundation area.

13.1.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

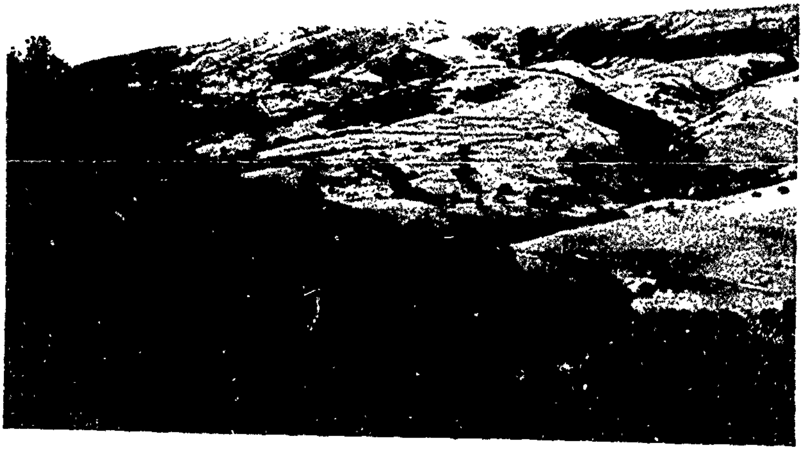
The Chupines Creek Dam and Reservoir site is located near the confluence of Chupines Creek and Tularcitos Creek. Terrain is gently rolling as compared with the other previously discussed dam sites. Grasses and chaparral influence the visual quality of the hills. Dense clusters of oak trees occur on slopes and in drainages, calling attention to the rolling landform.

The Chupines Creek site is privately owned and is not accessible to the public. On-site roads are unpaved and private. Views to the site are obtained from Cachagua Grade, on the opposite side of the canyon. However, Cachagua Grade is not considered to be a scenic route. Figure 13-4 illustrates existing views to Chupines from Cachagua Grade.

The proposed project would include construction of the dam, resulting in inundation of approximately 200 acres upstream along Chupines Creek and three tributary streams, construction of an access road, and installation of a steel pipe between the dam and the existing San Clemente Dam and reservoir.

SITE PHOTO

FIGURE 13-4



View toward Chupines Dam site from Cachagua Road.

SOURCE EIP ASSOCIATES

88089

13.1.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

The Cañada Reservoir would be located within Cañada de la Segunda Canyon, on the north side of the Carmel Valley. An earth- and rock-fill embankment dam would be constructed within the canyon. The dam would be located in a steeply sloping portion of the hills that flank the Carmel River and Carmel Valley Road, resulting in the inundation of approximately 275 acres of land.

The project site is not visible from the primary travel corridor in the area, Carmel Valley Road. The dominant view from this road is toward the Carmel River that traverses the Carmel Valley floor (see Figure 13-5).

13.1.9 7 MGD DESALINATION PLANT (7 DSL)

This alternative would involve the construction and operation of a 7 MGD desalination plant at one of two alternative sites, as described in Section 13.1.2 for the 16 NLP/D. The visual character of the desalination plant sites would likely not be affected by the addition of facility structures.

13.1.10 NO PROJECT ALTERNATIVE (NO PRJ)

Under this alterative, the use of existing facilities would continue, and current operations would persist. Only minor modifications and additional construction of wells is proposed. All visual conditions would be similar to the present situation.

13.2 IMPACTS OF PROJECT OPERATION

STANDARDS OF SIGNIFICANCE

For the purposes of this EIR/EIS, visual impacts are considered to be significant if they would have a substantial, demonstrable negative aesthetic impact. This determination is based on several criteria including. alteration to existing natural features and visual conditions, impact on near and far views to the project site, the ability of the landscape to absorb visual change, the introduction of compatible or incompatible visual change, the location of the observer, and, proposed restoration of disturbed areas. In addition, the loss of Carmel River flow altogether, thus exposing a dry riverbed, is considered a significant visual impact.

SITE PHOTO

FIGURE 13-5

Existing visual character of the Carmel River Valley as seen from Carmel Valley Road

SOURCE EIP ASSOCIATES

88089

The following factors were taken into account in this analysis: change in existing views of the project area from public areas, extent of terrain modification proposed, impact on site vegetation, effect on downstream riparian vegetation, impact on existence of a flowing river, scale and mass of proposed facilities, clearing impacts, and the visual effect of a "bathtub-ring" around the reservoir resulting from water draw-down.

Analysis of the river flow and riparian impacts are based on Figures 7-6 and 7-7 in Section 7.3 of Chapter 7, and Figure 9-9 in Chapter 9.

13.2.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

The proposed 24 NLP alternative would establish a new water impoundment with a maximum water surface elevation of 1,120 feet. The new reservoir would completely inundate the existing Los Padres Dam and Reservoir, and extend about 2.6 miles up the Carmel River behind the new dam. The dam would be about 264 feet high and extend about 1,600 feet along its crest.

Impact

13.2.1-1 **Existing visual conditions of the Carmel Valley behind the new dam would be altered.**

The natural terrain, vegetation and visual character of the existing landscape would be permanently modified due to the project. Removal of vegetation, alteration of the hillslopes, inundation of the valley, and construction of the new dam would result in visual change. The loss of visual resources would be considered insignificant in this area due to current site conditions and the proximity of the site to the existing dam and reservoir. Recreational trail users would be impacted to the greatest degree, especially those hiking in the Ventana Wilderness and using the Carmel Valley Trail. The completed project would also be noticeable when viewed from aircraft flying directly over the project area

The proposed 24 NLP alternative would affect views from private lands that are presently undeveloped. Opinions would differ as to whether views from these lands would be impaired or enhanced. Some people may believe that the conversion of river canyon to reservoir is undesirable, while others may feel it is visually beneficial and adds interest.

Water levels below full capacity of the impoundment would reveal barren soil between the water surface and vegetation of the high water rim. The ring of bare earth would visually contrast with the woodland setting of the valley hillsides and appear out of character with the setting. However, because of limitations on public access and public use of the project area, objections to this visual condition would be expected to be insignificant before and after project construction.

Mitigation Measure

13.2.1-1 *None necessary.*

Impact

13.2.1-2 **The 24 NLP would result in beneficial impacts to the aesthetic quality of the Carmel River and the riparian corridor downstream of the existing San Clemente Dam, as well as the Carmel River Lagoon.**

The project as proposed would result in increased downstream releases, which would maintain a continuous flow of water in the Carmel River throughout twelve months of the year in all but the driest years. Presently, the river dries up for several miles even in normal years. Any change to the existing riparian vegetation along the banks of the Carmel River would affect the visual quality of the river corridor downstream of the proposed dam. The increased flows and high water tables resulting from the project would preserve and enhance riparian vegetation. In addition, continuous inflow would increase the area and volume of the Carmel River Lagoon, a popular area for birding. These would be considered beneficial impacts

Mitigation Measure

13.2.1-2 *None necessary.*

13.2.2 16,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (16 NLP/D)

The 16,000 AF Los Padres project would inundate about 225 acres of land in the area between the proposed dam and the existing facility. The inundation area would include the existing Los Padres Dam and Reservoir. Height of the Los Padres Dam would be about 234 feet and would

extend about 1,400 feet between the canyon walls. The 16 NLP/D alternative would also incorporate a 3 MGD desalination plant at one of two utility sites described previously.

Impact

13.2.2-1 **Existi... isual conditions of the Carmel Valley behind the new dam would be alter...**

Visual impacts previously described for the 24,000 AF New Los Padres Dam and Reservoir would apply to the 16,000 AF project at the same location. However, these impacts would occur to a lesser degree due the smaller inundation area. Please refer to the discussion under Impact 13.2.1-1. This impact would be insignificant both during and following construction.

Mitigation Measure

13.2.2-1 *None necessary.*

Impact

13.2.2-2 **The 16 NLP would result in beneficial impacts to the aesthetic quality of the Carmel River and the riparian corridor downstream of the existing San Clemente Dam, as well as the Carmel River Lagoon.**

Under this alternative, the Carmel River would flow continuously for twelve months of the year during normal years for eight months of the year during dry years In either case, this would provide significantly more flow than under the existing conditions, and would benefit riparian and lagoon habitat. These would be considered beneficial impacts.

Mitigation Measure

13.2.2-2 *None necessary.*

Impact

13.2.2-3 **Desalination facilities may result in changes to existing visual conditions.**

The two sites being considered would be located at existing utility plants. At this level of review, the impact is considered to be less than significant. The visual impacts of desalination will be determined in greater detail in a separate EIR.

Mitigation Measure

13.2.2-3 *None necessary at this level of analysis; projects would be designed to minimize visual effects.*

13.2.3 9,000 AF NEW LOS PADRES RESERVOIR/DESALINATION

The 9,000 AF Los Padres project would establish a new water impoundment with a maximum normal water surface elevation of 1,050 feet. The new reservoir would inundate the area between the proposed dam and the existing facility. The inundation area would also inundate the existing Los Padres Dam and Reservoir, slightly increasing the amount of land covered by water. Height of the Los Padres Dam would be about 194 feet and would extend 1,330 between the canyon walls. The 9 NLP/D alternative would also incorporate a 3 MGD desalination plant as described for the 16 NLP) alternative.

Impact

13.2.3-1 **Existing visual conditions of the Carmel Valley behind the new dam would be altered.**

Visual impacts previously described for the 16 NLP/D alternative would apply to the 9,000 AF project at the same location. However, these impacts would occur to a lesser degree due the smaller inundation area. Please refer to the discussion under Impact 13.2.2-1. This impact would be insignificant both during and following construction.

Mitigation Measure

13.2.3-1 *None necessary.*

Impact

13.2.3-2 **The visual quality of the Carmel River and the riparian corridor would be adversely impacted with the 9 NLP/D alternative. The existing degradation of the Carmel River Lagoon would continue.**

Under this project alternative, continuous flows in the Carmel River would occur only six out of 12 months during normal years, and only three months in dry years. Similar to the current situation, riparian and lagoon habitat would be degraded. These impacts would be considered significant, similar to those documented in the Water Allocation Program Final EIR.

Mitigation Measure

13.2.3-2 *Mitigation measures described in the Water Allocation Program EIR should be implemented to decrease the loss of riparian vegetation and lagoon habitat, and preserve the present visual quality of the area. (See Appendix 2B)*

Mitigation measures discussed in the Water Allocation EIR include: water conservation programs, identification of riparian areas to control drawdown and minimize the onset of water stress, enhancement of existing riparian areas, creation of new riparian habitat, purchase of conservation easements, revegetation, and, removal of non-riparian and non-native plant species from the riparian corridors. Lagoon mitigation measures include: enhancement plan investigations, long-term monitoring and methods to maintain adequate lagoon volume. This impact would be potentially significant and unavoidable following the implementation of mitigation measures, because it is unclear whether the river flow impacts could be mitigated.

Impact

13.2.3 3 **Desalination facilities may result in changes to existing visual conditions, but are expected to be less than significant.**

As described in Impact 13 2 2-3, visual impacts of desalination facilities could result in minor changes to views near existing utility plants. The visual impacts of desalination will be studied further in a separate EIR.

Mitigation Measure

13.2.3-3 *None needed at this level of analysis; projects would be designed to minimize visual effects.*

13.2.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

The 23 NSC alternative project would result in the establishment of a new water impoundment area with a maximum normal water surface elevation of 643 feet. The new reservoir would inundate the existing San Clemente Dam and Reservoir, and extend about three miles up the Carmel River behind the new dam. Height of the dam would be about 254 feet, and it would extend 920 feet between the canyon walls.

Impact

13.2.4-1 Existing visual conditions of the Carmel Valley behind the new dam would be altered.

Given that the public is restricted from access to and use of the project canyon area, loss of the visual resources noted above would be considered insignificant.

Because of its location within the river canyon, the topography restricts visual access to the project area from Carmel Valley Road, about two miles to the north. The project would not be seen from any residential structures in the area. There is one residence located on a ridge about 2,000 feet north and 600 feet above the proposed dam structure. The dam and impoundment area would be seen from the property on which the residence is constructed, but would not be seen from the residence itself because of the vegetation and sloping terrain. Greatest visual access of the completed project would be from an aircraft flying directly over the project area.

The 23 NSC alternative would affect the views from private lands that are currently undeveloped. Opinions would differ as to whether the visual change would be adverse or beneficial

Water levels that fall below full capacity would reveal barren soil between the water surface and vegetation of the high water rim. This "bathtub-ring" would visually contrast with the woodland setting of the valley hillsides and appear out of character with the existing setting. However,

because of the restrictions to public access and use of the project area, the visual impacts would be less than significant.

Mitigation Measure

13.2.4-1 *None necessary.*

Impact

13.2.4-2 **The 23 NSC would result in beneficial impacts to the aesthetic quality of the Carmel River and the riparian corridor downstream of the existing San Clemente Dam, as well as the Carmel River Lagoon.**

Continuous flows would occur during 12 months of the year during normal and dry years under the proposed 23 NSC project. This would be a significant improvement over the No Project alternative and the existing situation, where flows would occur only seven months during normal years and three months during dry years. Visual quality benefits would also be realized through the maintenance or increase of riparian and lagoon habitat. These would be considered beneficial impacts.

Mitigation Measure

13 2.4-2 *None necessary.*

13.2.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

The 6 CAC/D alternative would establish a new water impoundment with a maximum normal water level of 1,434 feet. Inundation would occur along the main branch and two tributary branches of Cachagua Creek. The new lake would extend about two miles up Cachagua and Finch Creeks. The dam would be about 199 feet high and extend 850 feet along its crest.

This alternative would also incorporate a 3 MGD desalination plant at one of several sites under consideration. Potential visual impacts may occur if existing facilities are modified in size or scale, or, if new facilities are constructed.

Impact

13.2.5-1 **Existing visual conditions of the project site would be permanently changed with the introduction of the dam and reservoir as new visual elements.**

Visual quality of the valley behind the dam and below the water surface would cease to exist. The landscape would be permanently altered by the proposed project. Because the public utilizes the Cachagua Grade Road through the project area on a regular basis, the impact would be highly noticeable. While the impact would be adverse, it would be considered less than significant, as Cachagua Road is not a designated scenic corridor. Other visual changes include the relocation of Cachagua Road and construction of a new bridge for the relocated road to cross the creek.

Mitigation Measure

13.2.5-1 *None necessary.*

Impact

13.2.5-2 **The visual quality of the Carmel River and the riparian corridor would be adversely impacted with the 6 CAC/D alternative. The existing degradation of the lagoon would also continue.**

During normal years, continuous flow would occur during seven months of the year, and for three months in dry years This would be similar to the No Project condition for riparian and lagoon habitat and riverflow, which would provide a negative visual impact. See Impact 13.2.3-2 for the 9 NLP/D.

Mitigation Measure

13.2.5-2 *Mitigation measures as presented in the Water Allocation Program EIR should be implemented (see Mitigation Measure 13.2.3-2) It is unclear whether visual effects can be improved. Thus, these impacts remain as potentially significant and unavoidable.*

Impact

13.2.5-3 **Desalination facilities may result in visual changes as seen from public areas, but are expected to be less than significant.**

As described in Impact 13.2.2-3, visual impacts of new facilities would result in minor changes to views near existing utility plants. The visual impacts of desalination will be studied in a separate EIR.

Mitigation Measure

13.2.5-3 *None needed at this level of analysis; projects would be designed to minimize visual effects.*

13.2.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

The 11 SCC alternative would result in the establishment of a new water impoundment area with a maximum normal water surface elevation of 885 feet. The new reservoir would inundate an area of about one mile up San Clemente Creek behind the new dam. Height of the dam would be about 290 feet, and it would extend 1,290 feet along its crest.

Impact

13.2.6-1 **Existing visual conditions of the San Clemente Creek Valley behind the new dam would be altered.**

Given that the public is restricted from access to and use of the project canyon area, loss of the visual resources noted above would be considered insignificant.

Because of its location within the river canyon, the topography restricts visual access to the project area from Carmel Valley Road, about two miles to the north. The project would not be seen from any residential structures in the area. There is one residence located directly on a ridge about 2,000 feet north and 600 feet above the proposed dam structure. The dam and impoundment area would be seen from the property on which the residence is constructed, but would not be seen from the residence itself because of the vegetation and sloping terrain. Greatest visual access of the completed project would be from aircraft flying directly over the project area.

The 11 SCC alternative would affect the views from private lands that are currently undeveloped. Opinions would differ as to whether the visual change would be adverse or beneficial. Water levels that fall below full capacity would reveal barren soil between the water surface and vegetation of

the high water rim. This "bathtub-ring" would visually contrast with the woodland setting of the valley hillsides and appear out of character with the existing setting. However, because of the restrictions to public access and use of the project area, the visual impacts would be less than significant.

Mitigation Measure

13.2.6-1 *None necessary.*

Impact

13.2.6-2 **Beneficial visual impacts would occur as a result of increased downstream flows in the Carmel River.**

Carmel River flows would be continuous for 11 months of the year during normal years, compared to seven months for the No Project. This would in turn support and sustain riparian and lagoon habitat, thus resulting in improved visual quality over existing conditions. Although flow would occur for only five months in dry years, this is an improvement over existing conditions. Water tables would remain high enough to sustain riparian vegetation. Thus, the overall impact would be beneficial

Mitigation Measure

13.2.6-2 *None necessary.*

13.2.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

This 10,500 AF dam and reservoir project would establish a new water impoundment area with a maximum water surface elevation of 762 feet. Surface area of the reservoir would be about 173 acres at the spillway crest elevation. The dam would be about 182 feet high and measure about 1,400 feet along its crest.

Impact

13.2.7-1 **Existing visual conditions of the Chupines Creek project area would be permanently changed as a result of the project.**

The project would be located on private land, but the project would be seen from the Cachagua Grade, on the opposite side of the canyon. This loss of visual resources, while adverse, would be considered insignificant. There are no residences in the immediate vicinity of the project. Views from private undeveloped lands surrounding the project site would be affected. Opinions would vary as to whether those views are improved or degraded.

As previously discussed for the other alternative sites, water levels below full capacity of the impoundment would reveal barren soil between the water surface and vegetation of the high water rim. The resulting "bathtub-ring" may appear out of character with the setting. However, because this area is not heavily wooded, this effect would not be as severe as in densely forested areas, and the impact would be considered insignificant.

Mitigation Measure

13.2.7-1 *None necessary.*

Impact

13.2.7-2 **Increased flows would result in beneficial visual conditions along the Carmel River downstream of the project.**

Carmel River flows would be continuous for 12 months each year during normal years, but only for four months each year during dry years. Similar to the 11 SCC alternative, the overall impact to visual quality would be beneficial.

Mitigation Measure

13 2.7-2 *None necessary.*

13.2.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

The 25 CAN alternative would involve the construction of an off-stream pump storage reservoir. Excess flows would be captured and transmitted to a storage reservoir for municipal use.

The proposed project would have normal maximum water surface elevation of 504 feet. The dam would be about 320 feet above the existing streambed, and would have a crest length of 1,320 feet. The inundation area would cover about 275 acres. As the project would be in a narrow valley on private land, no visual impact would be expected to occur with regard to views from public roads or other public viewpoints in the area.

This alternative would also include a river intake, pump and transmission facilities Some of the project components would be located on the south side of Carmel Valley Road and would be visible from the road.

Impact

13.2.8-1 **The existing visual conditions in the vicinity of the proposed Cañada Dam would be permanently altered.**

The proposed earthen dam and reservoir would cover an estimated maximum 275 acres. The downstream face of the dam would appear as a flat, sloping plane with a slope of 5.1 within the canyon walls. Because of the area's topography, most vantage points of the dam and reservoir area offer only partial views of the dam and reservoir. The dam would be most visible to those property owners immediately downstream (south) of the dam While the dam would not be visible from Carmel Valley Road, the project would be entirely visible during aerial flyovers of the project site.

A spillway would be included with the proposed dam that would consist of a relatively deep, narrow-bottomed cut through the ridge at the east abutment. The spillway would be lined with concrete, and would discharge to an energy dissipation structure prior to entering the natural streambed. Electric power would also be necessary at the dam, and overhead powerlines would be visible. However, each of these elements would be small in relation to the size of the dam and are considered insignificant.

The water level within the reservoir would fluctuate substantially as river flow is stored during the winter months and released during the summer and fall. As the water level drops from its highest elevation, exposed soils of the shoreline would be visible to the residents of a proposed development that would surround the reservoir. Partial views of the reservoir surface would be

available from areas surrounding the reservoir. The change would appear as a shift from the existing forested hillsides and rolling oak grasslands to views of a large body of standing water.

The significance of this alteration would differ from one individual to the next. Views of water are generally regarded as an amenity, although man-made reservoirs can result in unnatural appearances at the shoreline due to water level fluctuations. Overall, the impact is judged to be insignificant.

Mitigation Measure

13.2.8-1 *None required; however, it is recommended that future developments in the vicinity of the proposed project be designed to allow for the optimum location, orientation and landscaping of future residences to maximize positive view corridors and minimize the visual impact of embankment structure.*

Impact

13.2.8-2 **The proposed water treatment plant would affect the visual character of the project site.**

The proposed water treatment plant would be located on a relatively flat terrace adjacent to the Carmel River south of Carmel Valley Road. The plant would consist of 45,000 square feet of sludge drying beds, the water treatment plant itself and support buildings. Much of the structure would be constructed underground, and all above-grade structures would be compatible with buildings in the surrounding area, with no structures greater than 25 feet above the existing ground surface. Existing natural buffers include a row of mature cypress trees along Cypress Lane to the east, and the mature Carmel River riparian corridor to the south.

The treatment plant would be visible from seven existing homes located along Cypress Lane, and may be visible from future residences proposed on Williams Road. The plant would also be visible from Carmel Valley Road because of the open, level terrain between the road and the plant, event though the distance from Carmel Valley Road to the water treatment plant would be over 1,200 feet. Because of the large number of people that use Carmel Valley Road, the impact is judged as significant.

Mitigation Measure

13.2.8-2 *(a) Extensive landscaping would be included as part of the water treatment plant construction to filter views from Carmel Valley Road and, to the extent possible, from existing and future residences in the project area.*

(b) Architectural design of all structures would be in accordance with Carmel Valley Master Plan (CVMP) policies regarding public utilities (CVMP Policy 31.1.4 (CV)).

Implementation of these measures would reduce the potential impacts of the water treatment plant to visual quality to an insignificant level.

Impact

13.2.8-3 **Significant visual impacts would occur due to lack of river flow, adverse impacts to the riparian corridor of the Carmel River and continuing degradation of the Carmel River Lagoon.**

Downstream flows would be similar to the existing conditions with this proposed alternative. Flows would occur for seven months during the year in normal years and four months per year during dry years. Riparian habitat would be threatened and further losses may occur. Lagoon volume would remain diminished as well. Significant visual impacts would occur as a result of this alternative.

Mitigation Measures

13.2.8-3 *Mitigation measures as presented in the Water Allocation Program EIR should be implemented (see Mitigation Measure 13.2.3-2). It is unclear whether visual effects can be improved. Thus, these impacts remain as potentially significant.*

13.2.9 7 MGD DESALINATION PLANT (7 DSL)

Impact

13.2.9-1 **Construction of a 7 mgd desalination plant may result in visual changes as seen from public areas, but are expected to be less than significant.**

As previously described, in Impact 13.2.2-3, the two desalination site alternatives would be located at existing power plant and wastewater facilities. The visual impacts of desalination will be studied further in a separate EIR.

Mitigation Measure

13.2.9-1 *None necessary at this level of analysis. Projects would be designed to minimize visual effects.*

Impact

13.2.9-2 **Visual impacts would occur due to lack of river flow and adverse impacts to the riparian corridor of the Carmel River and continuing degradation of the Carmel River Lagoon.**

The loss of riparian habitat would be the same as with the No Project alternative discussed below. Flows would be available seven months per year during normal years and three months per year during dry years. Lagoon habitat would remain diminished as well. Significant visual impacts would occur as a result of this alternative.

Mitigation Measure

13.2.9-2 *Mitigation measures as presented in the Water Allocation Program EIR should be implemented (see Measure 13.2.3-2). It is unclear whether streamflow can be improved. Thus, these impacts remain as potentially significant and unavoidable.*

The measures described under Mitigation Measure 13.2.3-2 above should be implemented to reduce the loss of riparian and lagoon habitat, and maintain the visual quality of the area. As noted previously, it is unclear whether visual impacts could be corrected.

13.2.10 NO PROJECT ALTERNATIVE (NO PRJ)

Impact

13.2.10-1 **Visual impacts would occur due to lack of river flow and adverse impacts to the riparian corridor of the Carmel River and continuing degradation of the Carmel River Lagoon.**

Presently, low flows within the Carmel River have adversely affected the visual quality of the river and the amount and diversity of riparian vegetation growing within the riparian corridor. The Carmel River Lagoon has also been degraded. Under No Project conditions, these adverse impacts would continue, resulting in significant impacts to the visual resources of Carmel Valley.

Mitigation Measure

13.2.10-1 *Mitigation measures outlined in the Water Allocation Program EIR should be implemented to maintain riparian and lagoon habitat and protect visual resources. Based on that report and the inability to maintain flow, the visual impacts would be potentially significant and unavoidable.*

13.3 IMPACTS OF PROJECT CONSTRUCTION

For following discussion applies to all of the project alternatives under consideration which proposed clearing, grading, and modification of terrain. Visual impacts associated with project construction would be expected to occur and last at least through the duration of construction. Some potential impacts, by their nature, would persist beyond the construction phase.

Impact

13.3.1-1 **Project construction would increase ambient light levels in the region during periods of nighttime construction.**

Project construction would, at times, necessitate the use of nighttime lighting to illuminate areas after daylight hours or prior to sunrise. Construction of the proposed RCC dams (24 NLP, 16 NLP, 9 NLP, 23 NSC and 11 SCC) would involve a period of about six months when 24-hour construction would be necessary. Construction of the other alternatives would necessitate some night work, but less than for the RCC alternatives. During these periods of night work, ambient light levels would increase dramatically, and the potential for glare to nearby residences or other sensitive receptors could increase. Also, illumination with high-powered lighting would result in a "glow" that may be visible from a distance and call attention to the project site. While this impact would be considered insignificant, it would contribute to other construction impacts such as traffic (Chapter 10), air quality (Chapter 11) and noise (Chapter 12).

Mitigation Measure

13.3.1-1 *Lighting of nighttime construction activities would be focused and directional, and would minimize the amount of spill-over light.*

Impact

13.3.1-2 **Quarrying of materials in borrow areas would result in visual impacts in the project area.**

Slopes would be disturbed and vegetation would be removed as material is quarried from borrow areas. New access roads to the borrow areas would also impact the visual character, by disrupting the existing visual quality. The removal of vegetation would allow light to penetrate areas previously covered by grassland or dense tree cover. New species may establish in disturbed areas as light availability would increase. This is considered a significant impact, and is discussed in additional detail in Chapter 9, Vegetation and Wildlife.

Mitigation Measure

13.3.1-2 *Borrow areas outside of reservoir inundation areas shall be revegetated immediately upon completion of quarrying activities. It is recommended that topsoil be stock-piled for use during revegetation.*

Revegetation of these borrow areas would reduce this impact to an insignificant level.

14. HISTORY AND ARCHAEOLOGY

14.1 SETTING

In prehistoric times, the project area lay within the territory of the Esselen and Costanoan Native American groups. The Costanoans occupied the coastal areas from the Sacramento-San Joaquin Delta to Point Sur, south of Monterey. The Esselen, a much smaller group, occupied the upper Carmel River drainage and about 30 miles of the coast south of Point Sur. Very little information on the Esselen, the probable inhabitants of the project site, has survived.

During the last century, most of the property in the vicinity of the alternative reservoir sites was associated with the operations of Del Monte Properties Company and its predecessor, the Pacific Improvement Company. Prior to ownership by these companies, the land in the Upper Carmel Valley was open to homesteading and was settled in the 1880s and 1890s.

Pacific Improvement Company was incorporated in 1878 as a holding company and controlled the Central Pacific Railroad, which was operated by the "Big Four" Charles Crocker, Leland Stanford, Collis P. Huntington, and Mark Hopkins. In 1880-1881, Charles Crocker built the Del Monte Hotel in Monterey, a 126-acre resort/hotel/park that catered to guests from around the world.

The Del Monte Hotel and grounds, as well as other Pacific Improvement Company holdings in the Carmel-Monterey area, required a substantial water supply. This supply came from the Upper Carmel Valley In 1881, Pacific Improvement Company began purchasing acreage in the Upper Carmel River, including Rancho Los Laureles and a portion of Los Tularcitos Rancho as well as additional acreage surrounding the Carmel River and its tributaries. These lands provided a watershed from which an adequate water supply could be piped to the company's holdings of approximately 7,000 acres. Located below the junction of the Carmel River and San Clemente Creek, the Carmel Dam was built for this purpose by the Pacific Improvement Company in

approximately 1881-18°˜ Reportedly, 700 Chinese laborers were employed to build the concrete dam and its associated roads and to lay 26 miles of 12-inch pipe northwest to the Monterey and Pacific Grove area. Today the old dam still stands underwater downstream from the existing San Clemente Dam, and serves as a foundation for a bridge over the Carmel River.

In the 1890s and early 1900s, the Pacific Improvement Company improved the original ranch house of Rancho Los Laureles, and guests from the Del Monte Hotel who were interested in spending time in the country were transported there. Fishing and hunting trips were often planned in the Upper Carmel River Valley.

In 1915, Pacific Improvement Company holdings were acquired by Samuel F.B. Morse and associated financiers under the name of Del Monte Properties Company. The 10,000 acres of land were subsequently subdivided. In 1923, various parcels of the company's lands were sold, mostly to parties from the east coast. Resorts and ranches were established throughout the Carmel River Valley in the 1920s and 1930s, although the Del Monte Properties Company retained its holdings of lands immediately surrounding the Carmel River.

As Del Monte Properties Co.'s holdings and the Del Monte Hotel grew, it became necessary to establish a more reliable water source on the Carmel River In the years 1919 to 1921, the existing San Clemente Dam was built at the junction of the Carmel River and San Clemente Creek, approximately one-third mile upstream from the 1883 Carmel Dam. The dam, measuring 106 feet high above bedrock, with a crest length of 300 feet, is of concrete arch span construction.

In 1924, Del Monte Properties Co.'s San Clemente Dam was acquired by Monterey County Water Works Company. In approximately 1930, the Water Works' land was leased to Del Monte Properties Co at the dam, and the San Clemente Lake and Guest Ranch were established at the northwest end of the dam The resort was operated in conjunction with Del Monte's Fish and Game Preserve, which included holdings on both sides of the Carmel River. Later in the 1930s, several fishing/hunting/horseback riding lodges were set up on Del Monte Properties' land above and below the San Clemente dam An occasional early homestead cabin was also used for hunting or fishing expeditions The resort complex at San Clemente Dam was used mostly on weekends and holidays In the 1930s through the 1950s, rodeos were often held on a flat bench of land between the resort and San Clemente Creek.

In 1965, the American Water Works Co. purchased the assets of California Water and Telephone Co. (formerly Monterey County Water Works Co.) and formed California-American Water Company, which took over operation of San Clemente Dam. In the same year, Del Monte Properties Co. also subleased its "dude" ranch at the dam to Twin Rivers, a ground of recreationists from San Francisco. The San Francisco group operated the resort on weekends and holidays, with fishing, hunting and relaxation as the main activities.

The San Clemente resort complex continued to operate, with occasional use of the fishing/hunting cabins, until 1980 when Del Monte Properties Company's lease on the resort land expired and was not renewed under California-American Water Company ownership. In 1981, under the auspices of California-American Water Company, the remains of the resort were razed as part of a fire drill for the Forest Service. Only the damkeeper's cottage remains, and it is not permanently occupied.

In July 1978, Del Monte Properties Company sold approximately 1,600 acres of its land on the Carmel River, known as Murphy's Flat, to a group of 10 investors. One of the stone cabins on Murphy's Flat was subsequently restored and is presently used as a vacation/weekend fishing/recreation lodge.

Several other wooden cabins established by Del Monte Properties Company in the 1930s were subsequently used by private schools in the Carmel-Monterey area as weekend camping retreats.

The foregoing general historic information was summarized from two cultural resource survey reports prepared for the District in 1983 and 1987.[1,2] The following paragraphs describe the cultural resources directly associated with each of the project alternatives. In some cases, the alternative sites have been studied in detail, in other cases only partial surveys have been completed.

14.1.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

Only one cultural resource reconnaissance project has been conducted within the study area[3] The coverage of this survey within the proposed Los Padres Reservoir site area was limited to the area at and north of the existing Los Padres Dam. Other portions of the study area have been

examined during information studies, including some prior to construction of the dam. Areas at and south of the dam are likely to contain undiscovered cultural resources.

The following four cultural resources have been identified within New Los Padres Reservoir area.

CA-MNT-35

This site was recorded in August of 1948, prior to construction of the existing Los Padres Dam. It consists of a single bedrock mortar at the site of the trail but had no noticeable midden or occupation debris. The site record notes that it would be covered by about 50 feet of water when the reservoir was filled. The site record also notes a wood cabin nearby, and it presumably was inundated by the existing reservoir as well.

CA-MNT-36

This site was also flooded by the existing Los Padres Reservoir. It was described in the site record as two boulders with one and six mortars, respectively, along with a possible occupation area. The dimensions are listed as 10 by 30 yards. The sketch map, however, lists a third boulder with a bedrock mortar.

CA-MNT-37

This site is listed in the records as a small occupation site with an adjacent bedrock mortar and may have been inundated. The dimensions are listed as 25 yards in diameter. The site record notes that this resource is at the southern limit of the lake to be formed by the existing Los Padres Dam.

CA-MNT-787

This site is described as two grinding basins and three bedrock mortars situated within three separate boulders. It is located within the potential inundation area of New Los Padres Dam. No midden was noted when it was examined, but much of the area is covered by silt from the existing reservoir.

14.1.2 16,000 AF NEW LOS PADRES RESERVOIR/3 MGD DESALINATION PLANT (16 NLP/D)

The setting for the 16,000 AF New Los Padres Reservoir is as described above for the larger reservoir at the same site. The cultural resources assessment for the two desalination plant sites will be performed in a separate environmental document.

14.1.3 9,000 AF NEW LOS PADRES RESERVOIR/3 MGD DESALINATION PLANT (23 NSC)

The setting for the 9,000 AF New Los Padres Reservoir is as described above for the larger reservoir at the same site. The cultural resources assessment for the two desalination plant sites will be performed in a separate environmental document.

14.1.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

A cultural resource study of the New San Clemente sites was conducted in 1987.[4] A number of cultural resources had already been recorded for the vicinity, others were discovered as a result of the 1987 study. The sites and their characteristics are as follows:

CA-MNT-587

Two separate earthbound rocks containing a single mortar hole each and located approximately 40 meters apart were originally recorded on this site. However, field investigation failed to locate one of the two earthbound mortar rocks reported. No other cultural materials were located in association with the mortars, and the site does not appear to meet any of the criteria for National Register nomination.

CA-MNT-811H

This site is described in the record as containing the remains of a three-room cabin constructed in the 1930s by Del Monte Properties Co. in conjunction with their San Clemente Lake and Guest Ranch. The cottage's period of use appears to postdate the period of National Register significance criteria.

CA-MNT-812H

This site contains a stone and adobe cabin representative of a type of construction peculiar in Monterey County to the Upper Carmel Valley. Although the stonemason who built the cabin has not been identified, he may have been a member of a cultural group who brought the art of stoneworking to the Upper Carmel Valley as an immigrant, and was responsible for disseminating the form in the area.

In addition to its architectural significance, the site represents local applications and manipulation of United States public land laws regarding homesteading and preempting claims.

The site is recommended for nomination to National Register status at the local level of significance in the categories of exploration/settlement and possibly architecture Although a small amount of scattered debris dating to the ca 1880-1915 period was located in association with the cabin, no archaeologically significant deposits were identified.

CA-MNT-1247H

The 1987 report describes this site as containing the remains of a wooden cabin with a period of use that postdates the period of National Register significance

CA-MNT-1248H

This site contains the current San Clemente Dam and associated structures (including the remains of the San Clemente Guest Ranch).

Intensive archival research indicates that the San Clemente dam was very likely one of the first applications in the nation of the engineering principle of horizontal arch action and vertical beam action in arch load formulas defined by F.A. Noetzli in 1920. These principles revolutionized concrete arch dam construction. The dam site is recommended for nomination to the National Register at the level of significance in the category of engineering.

CA-MNT-1249H

This site contains the remains of Carmel Dam. The original masonry Carmel Dam was constructed in 1883-1884 (with enlargements and improvements constructed in 1891-1892) and may have represented one of the last applications in the United States of this type of gravity dam. It was a major undertaking of the Pacific Improvement Co. and directly affected the growth, development, and economics of the Monterey Peninsula for a period of 36 years. The dam is recommended for nomination to the National Register at the State level of significance in the categories of engineering, social history, and economics. It is further recommended that the dam be recorded by members of the Historic American Engineering Record.

CA-MNT-1250H

According to the 1987 report, this unlocated cabin site appears to have been destroyed by construction of the access road.

CA-MNT-1251H

The site contains the meager remains (foundation) of a cabin. Field investigations did not locate any significant archaeological deposits on site or in the immediate vicinity of the cabin remains

CA-MNT-1253H

This site contains two earthbound mortar rocks, but no cultural materials were found in excavations ot the site. The site does not appear to be eligible for nomination to the National Register.

14.1.5 6,000 AF CACHAGUA CREEK RESERVOIR/3 MGD DESALINATION PLANT (6 CAC/D)

Two cultural resource reconnaissance projects have been conducted within the Cachagua Creek study area. The first is the Edwards et al. study conducted in 1974.[5] The coverage of this survey within the project area was limited to Cachagua Creek, Conejo Creek, and a small portion of James Creek. Other portions of the study area are also likely to contain cultural resources, in particular Finch Creek. A second study examined the Featherbow Ranch to the south and west of the current project area. This was conducted by Breschini and Haversat in 1978.[6] Other cultural resources surveys have also been conducted in the general area

Six cultural resources have been identified within the project area. They are:

CA-MNT-588

This site is described as a sparse prehistoric midden with dam soil and fire-altered rock. About 10 bedrock mortars are reportedly associated with the site in at least three separate areas. The dimensions are listed as 50 x 50 meters. Burials have been reported at this site. A recent house is situated on the site, and Jamesburg Road crosses it.

CA-MNT-589

A small site partially destroyed by Jamesburg Road. The site was noted in the roadbank, and consists of some shell, bone, dark soil, rock and fire-altered rock. A single bedrock mortar is situated up the slope from the roadcut. The dimensions are described as 20 by 38 meters, and the depth is listed as up to about 1 meter. This site probably is a seasonal campsite.

CA-MNT-590

This site consists of a single bedrock mortar situated in a small rock outcrop on a stream terrace above Cachagua Creek No midden was noted at this site, but no subsurface investigations were conducted

CA-MNT-591

This site consists of a two bedrock mortars situated in a small rock outcrop on a stream terrace above Cachagua Creek. No midden was noted at this site, but no subsurface investigations were conducted.

Unrecorded Site

This site has never been recorded. The only existing information is a notation on a map that a "BRM" (bedrock mortar) site is situated north of Finch Creek within the eastern end of the current project area at Cachagua Creek.

Unrecorded Site

This site has never been recorded. The only existing information is a notation on a map that "19 BRMs" (bedrock mortars) are situated near Finch Creek within the eastern end of the current project area at Cachagua Creek.

The cultural resources assessment for the desalination plant will be performed in a separate environmental document.

14.1.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

Only one cultural resource survey of this area has been conducted.[3] The study examined only about 30 to 60 percent of the potentially affected area and did not include portions of the area most favorable for the discovery of prehistoric cultural resources. The only cultural resource identified was:

CA-MNT-810H

This is the remains of a wooden cabin recorded during 1974 At that time it was described as a deserted old cabin with a corrugated tin roof, 1 x 8 inch board siding, broken windows, and the doors down. An outshed with handcut poles for roof rafters, as well as a 1920s automobile and fences, were also noted. The building is situated on a flat about 30 meters from San Clemente Creek. The overall dimensions of the site are about 100 x 20 meters.

14.1.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

Only one cultural resource survey has been conducted within the study area.[7] The coverage of this survey within the proposed Chupines Creek site area was limited, it consisted primarily of contacting the landowner and visiting the sites he was willing to disclose. Other portions of the study area are also likely to contain cultural resources

CA-MNT-412

This site was recorded in 1974 by W. Olsen of the Department of Parks and Recreation. This site is described as 40 to 50 feet in diameter, and contains a dark, loose midden deposit, with little rock

and no bone, probably a seasonal site. (The Regional Information Center places CA-MNT-412 elsewhere, so a field visit and research will be needed to verify the nature and location of this site.)

CA-MNT-580

This site is recorded as 150 by 75 meters in size, and is described as a large occupation site at the junction of Chupines Creek and a small stream. The depth of the site is listed as unknown, but the property owner notes a previous excavation was so deep that a ladder was required to get into the units However, no excavation has ever been independently documented for this site. The soil is described as dark gray-black, greasy, and friable. A bedrock mortar with five holes is also located on the site Fragments of mammal bone, fire-altered rock, marine shell, manos, pestles, and at least one large sandstone mortar have been found on the site. At least one of the projectile points in the property owners collection came from this site

CA-MTN-581

This site is within about 200 meters of CA-MNT-580. It is described as 175 by 50 meters in size, and also appears to be a large occupation site. This is based partially on the dark gray-black, greasy, and friable soil At least five projectile points and one chert scraper have been found on this site. During the 1974 survey a hammerstone was found, and a mano was noted by the barn which may be from this site It is possible that some of the mortars and pestles in the property owner's collection are from this site. Also described as being on this site is the Trescony homestead, dating to 1848 A note in the site record mentions that this has been remodeled A barn, dirt road, and fences also cross the site.

14.1.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

Five archaeological reconnaissance surveys have been conducted in the Cañada Reservoir area.[4] The entire area has been surveyed and two potential sites identified They are:

CA-MNT-22

The Dietz reconnaissance failed to locate CA-MNT-22, and suggested a location to the south of Carmel Valley Road. This suggested location could be within the inundation area of the Cañada Reservoir However, the other archaeological reconnaissance projects that have examined this area

failed to locate any evidence of this resource (unless the scattered remains attributed to CA-MNT-950 represent the "gaming area" reported as CA-MNT-22).

CA-MNT-950

This site is recorded within the project area, and may be impacted by the transmission pipeline and/or pumping facilities. However, the 1988 field reconnaissance of the area failed to locate substantial evidence of this site, and recommended only an archaeological monitor during any earth-altering activities.

14.1.9 7 MGD DESALINATION PLANT (7 DSL)

Cultural resources for the two desalination sites selected for further review will be identified in a separate environmental document.

14.2 IMPACTS OF PROJECT FACILITIES

STANDARDS OF SIGNIFICANCE

A project would normally be considered to have a significant effect on cultural resources if it would disrupt or adversely affect a prehistoric or historic archaeological site, or a property of historic or cultural significance to a community or ethnic or social group.

14.2.1 24,000 AF NEW LOS PADRES RESERVOIR

Impact

14.2.1-1 **One known and other possible unknown cultural resource sites would be inundated by this reservoir.**

Four cultural resource sites have been identified in the Los Padres Reservoir area. Three have been inundated by the existing reservoir. The fourth, described as two grinding basins and three bedrock mortars, would be inundated by the proposed alternative; other presently unknown resources could also be inundated or destroyed by the project. This is therefore considered a significant impact.

Mitigation Measure

14.2.1-1 *If this alternative is selected, an intensive cultural resources reconnaissance shall be conducted to locate any previously unidentified cultural resources within the project area.*

Limited subsurface testing should be conducted at the one BRM site (CA-MNT-787) as well as at any newly discovered BRM sites to determine whether or not subsurface deposits are present. Any newly discovered resources with subsurface deposits should also be subjected to detailed subsurface investigations to determine their nature and extent, temporal affiliations, contents, and significance. Historical sites, if any are identified, should be subjected to the appropriate studies. The results of these initial studies can then be used to formulate and implement the detailed mitigation measures.

In addition, all earthmoving activities shall cease in the event that any previously undiscovered prehistoric or historic artifacts or human remains are unearthed during project construction, and a qualified archaeologist shall be retained to evaluate the findings and recommend measures to record or preserve the finding.

Implementation of these measures would reduce the potential impacts on cultural resources to a less than significant level.

14.2.2 16,000 AF NEW LOS PADRES/DESALINATION (16 NLP/D)

The impacts and mitigation measures for this alternative would be identical to those described in Section 14.2.1 for the 24 NLP alternative.

Evaluation of the potential impacts on cultural resources at the two desalination sites selected for further review will be addressed in a separate environmental document.

14.2.3 9,000 AF NEW LOS PADRES/DESALINATION (9 NLP/D)

The impacts and mitigation measures for this alternative would be identical to those described in Section 14.2.2 for the 16 NLP/D alternative.

14.2.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

Impact

14.2.4-1 **A number of historic and prehistoric cultural resources would be inundated by this reservoir.**

The 23 NSC would inundate two small bedrock mortar sites, but based on the information potential of these sites, the adverse impacts would be minimal. Seven historic sites would also be impacted, including one stone cabin and two dam sites determined eligible for the National Register of Historic Places. The impacts to the three sites eligible for the National Register must be considered significant based on their significance and information potential. However, the following mitigation measures should reduce the impacts to a less than significant level.

Mitigation Measures

14.2.4-1(a) *All photographs and records of restoration work on Site CA-MNT-812H should be reviewed to determine the degree of architectural integrity retained by the restored structure.*

14.2.4-1(b) *San Clemente Dam on Site CA-MNT-1248H should be recorded by members of the Historic American Engineering Record. Additional research should also be undertaken to place the dam more precisely in the context of engineering history and applications.*

14.2.4-1(c) *The remains of Carmel Dam, on Site CA-MNT-1249H, should be recorded by members of the Historic American Engineering Record. Additional research should also be undertaken to more precisely place the dam in the historical context of masonry gravity dam technology.*

14.2.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

Impact

14.2.5-1 **The Cachagua Creek Reservoir would inundate two midden sites and four bedrock mortar sites.**

Recent studies in Northern Monterey County have turned up subsurface cultural materials at two bedrock mortar sites where previous field work had failed to unearth any deposits. Based on these recent findings, it is possible that one or more of the Cachagua Creek sites may contain subsurface materials. Thus, the impacts to these resources must be considered significant.

Evaluation of the potential impacts on cultural resources at the two desalination sites selected for further review will be addressed in a separate environmental document.

Mitigation Measure

14.2.5-1 *If this area is selected, an intensive cultural resources reconnaissance should be immediately conducted to locate any previously unidentified cultural resources within the project area.*

The two prehistoric sites (and any newly discovered resources that contain subsurface deposits) should be subjected to detailed subsurface investigations to determine their nature and extent. temporal affiliations, contents, and significance. These studies should be similar to, although not as extensive, as those recommended for the Chupines Creek Site area. Limited subsurface testing should be conducted at the four BRM sites, as well as at any newly discovered sites of a similar nature to determine whether subsurface deposits are present. If any historical sites are identified, they should be subjected to the appropriate studies as recommended in the reconnaissance report. The results of these initial studies can then be used to formulate and implement the appropriate mitigation measures.

14.2.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

Impact

14.2.6-1 **This site has only one known cultural resource, a wooden cabin and related outbuildings, that would be inundated by the reservoir.**

It is possible that one or more prehistoric sites would be found during a systematic survey, particularly in the area of the junction of San Clemente and Black Rock Creeks. Based on our present knowledge, there would probably be less than significant impacts to cultural resources within this area

Mitigation Measure

14.2.6-1 *If this area is selected, an intensive cultural resources reconnaissance should be immediately conducted to locate any previously unidentified cultural resource within the project area*

This should include subsurface augering of the one known historic site, CA-MNT-810H, to determine whether subsurface materials are present. Any newly identified cultural resources should be recorded and evaluated in a manner similar to those within the San Clemente Dam site. Following the reconnaissance and evaluation, the appropriate mitigation measures should be formulated and implemented.

14.2.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

Impact

14.2.7-1 **The Chupines Creek Reservoir would inundate three known prehistoric sites (two of which are described as large occupation sites) and an historic site (1848 Trescony Homestead).**

Based on the nature and quantities of cultural materials found at the prehistoric sites, the impacts of this alternative would be judged significant. In addition, although the Trescony homestead has apparently been remodeled, it is likely that it retains considerable significance and that subsurface historic archaeological deposits may be present. For this reason, the impacts on historical resources for this site would also be significant.

Mitigation Measure

14.2.7-1 *The mitigation measure for this impact would be the same as that for Impact 14.2.6-1.*

The three prehistoric sites should be subjected to detailed subsurface investigations to determine their nature and extent, temporal affiliations, contents, and significance. The investigations should be conducted by an archaeologist certified with the Society of Professional Archaeologists with documented experience within the general project area. Following the excavations, detailed analyses (including faunal, shell, lithic, ground stone, etc.) should be completed, and radiocarbon and other appropriate dating techniques should be employed. The results of the investigations should be detailed in a professional-quality technical report submitted to the Monterey County Planning Department and to the Regional Information Center at Sonoma State University within one year following completion of the field investigations. These resources should also be evaluated

to determine their eligibility for nomination to the National Register of Historic Places. Mitigation measures should be formulated and implemented as deemed necessary, based on the results of the above project.

The reported Trescony homestead should be subjected to detailed historical background research, architectural investigations, and historical archaeological excavations to determine the history of the homestead and whether or not significant cultural resources still remain. The results of these initial studies can then be used to formulate and implement the appropriate mitigation measures. However, given the importance of these historic and prehistoric cultural resources and the uncertainty at this time of adequate mitigation, this impact would be considered potentially significant and unavoidable.

14.2.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

Impact

14.2.8-1 **There is evidence that potentially significant cultural resources would be impacted by the construction of this reservoir.**

Mitigation Measure

14.2.8-1 *For the area south of Carmel Valley Road, an archaeological monitor should be present during all brush or vegetation clearing, grading, trenching, pad construction, and other earth-altering activities.*

The monitor shall have the power to temporarily halt construction if intact or potentially significant archaeological resources or human remains are encountered, until the find(s) can be evaluated by a qualified professional archaeologist. If the find(s) is determined to be significant, appropriate mitigation measures shall be formulated and implemented.

14.2.9 7 MGD DESALINATION PLANT (7 DSL)

Evaluation of the potential impacts on cultural resources at the two desalination sites selected for further review will be addressed in a separate environmental document.

14.2.10 NO PROJECT ALTERNATIVE

The no project alternative would have no effect on cultural resources.

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1. WESTEC Services, Cultural Resources Survey, San Clemente Dam Enlargement, December, 1983.

2. Archaeological Consulting, Archaeological and Historical Investigations for the San Clemente Dam EIR/EIS, May, 1987.

3. Edwards, R.L.; P.P. Hickman and G.S. Breshchini, 1974. Assessment of the Impact on the Cultural Resources of the Proposed San Clemente Dam, Upper Carmel Valley, Monterey County, California. Ms. on file (E-217 MNT), Regional Information Center of the California Archaeological Inventory, Sonoma State University, Rohnert Park, California

4. Archaeological Consulting, Op. Cit.

5. Edwards, et. al. Op. Cit.

6 Breschini G S and T. Haversat, 1978. Preliminary Archaeological Surface Reconnaissance of the Featherbow Ranch Cachagua Road, Upper Carmel Valley, Monterey County, California. Ms. on file (E-207 MNT), Regional Information Center of the California Archaeological Inventory, Sonoma State University, Rohnert Park, California.

7. Edwards, et. al. Op Cit.

15. PUBLIC HEALTH AND SAFETY

This chapter deals with the potential effects on public safety that could result from the construction and operation of each of the project alternatives. Effects on public health associated with seismicity are discussed in Chapter 6, Geology and Seismicity.

15.1 SETTING

15.1.1 DAM SAFETY

Regulatory Setting

Permitting and approval for any new dam and reservoir requires that the safety of the proposed dam be evaluated. The California Department of Water Resources, Division of Safety of Dams (DSOD) is responsible for approving all plans and specifications to construct dams and reservoirs within California. In addition, the U.S. Army Corps of Engineers (COE) has criteria for its own projects and guidelines for projects owned and operated by other entities. The purpose of DSOD and COE approval is to prevent the occurrence of conditions associated with the construction and operation of dams and outlet works that could cause loss of life or property damage downstream.

When the DSOD is satisfied that a proposed dam meets all applicable standards, approval of the project plans and specifications is issued. Immediately after dam construction is complete (but prior to filling of the reservoir) the DSOD inspects the completed dam and, if the completed dam meets all requirements, issues a Certificate of Approval which then allows the filling of the reservoir. The DSOD then maintains the right to periodically inspect the structure. Anyone who believes that a proposed dam is unsafe may file a complaint with the DSOD. A site inspection will then occur to determine whether the complaint is valid If it is determined that a dam is unsafe, the DSOD is authorized to take actions to protect public safety.

In general, dam safety criteria are a function of dam and reservoir size and the project location with respect to populated areas. Each of the dam/reservoir project alternatives evaluated in this document is in the "large" size category, based on dam heights greater than 100 feet. All of the projects have "high" hazard potential because of the number of residents and amount of property and improvements located downstream of the dam site.

Very few properly engineered dams have failed catastrophically in the last 50 years. Of the failures that have occurred, none has been in California. Two structurally inadequate dams in California have suffered earthquake damage severe enough to cause them to be abandoned. Lower Van Norman Dam in 1971 and Sheffield Dam prior to World War II. In neither case did the reservoir lose water, and residents of downstream areas at risk of inundation were successfully evacuated with no loss of life. The only catastrophic dam failure in the United States in recent years was the Teton Dam failure in Idaho in June 1976, failure of this dam resulted in the implementation of increasingly stringent and sophisticated design and construction techniques.

Flood Design Criteria

For a large dam with high hazard potential, the spillway must be capable of safely passing the probable maximum flood, or PMF. The PMF is defined as the flood that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region over the life of the project. Consequently, overtopping of a dam would be an event with an extremely low probability. During the project feasibility study phase, PMF estimates were assembled for each of the project alternatives. However, if a certain dam alternative is selected, additional PMF analysis will be performed during final design and permitting.

Seismic Design Criteria

Every new dam in California must be designed to withstand the maximum credible earthquake, or MCE, without incurring serious damage. An MCE is defined as the most severe earthquake that is believed to be possible at the site based on geologic and seismological evidence. The MCE is determined by regional and local studies that include a complete review of all historical earthquake data for events sufficiently nearby to influence the project, all faults in the area, and attenuations from causative faults to the site.

Geotechnical studies for seismic considerations have been performed for the New San Clemente and Cañada sites, and to a lesser level of detail for the New Los Padres and San Clemente Creek sites. These studies include literature review, mapping of geologic faults in the region, review of historical earthquakes in the region, determination of MCE for the dam site, and evaluation of slope stability in the reservoir area.

Any dam/reservoir alternative selected would require additional evaluation of conditions relative to seismic design criteria as part of the final design and permitting process.

Dam Failure Analysis

Construction of any of the dam/reservoir project alternatives would increase the potential for loss of life or damage to property in the event of a dam failure. However, because of the design and construction standards in place as part of the permitting process for dams, dam failure is an extremely remote possibility.

An Emergency Action Plan is required for all dam/reservoir projects for use in case of any problem or failure that could cause injury to project operations, or to persons or property located downstream. As part of the Emergency Action Plan for a dam, inundation maps are prepared where there is potential for flooding and damage from dam failure.

The purpose of a dam failure analysis is to prepare inundation maps for inclusion in the Emergency Action Plan. Such a study was performed in 1987 for three sizes of a dam at the New San Clemente site (16,000 AF, 20,000 AF, and 29,000 AF reservoir). Because of the large number of dam/reservoir projects presently being considered, analyses have not been performed for the other sites or for a 23,000 AF New San Clemente project. If a specific dam project is selected, a dam failure analysis will be performed as part of the permitting process under authority of the DSOD and the State Office of Emergency Services.

The main factors affecting the nature and extent of damage from a dam failure are the dam height, reservoir volume, type of dam construction (concrete gravity, concrete arch, earthfill or rockfill embankment, etc.), and location with respect to inhabited or developed areas. In general, the higher the dam, the larger the reservoir, and the closer to populated or developed areas, the

greater the potential damage. Concrete gravity or arch dams are typically assumed to breach more rapidly than earthfill or rockfill embankment dams of comparable size, resulting in a larger flood wave and greater damage potential. Table 15-1 provides a summary of the data pertinent to a dam failure analysis.

15.1.2 POTABLE WATER QUALITY

Cal-Am conducts extensive water quality tests on surface water from the Carmel River and groundwater from the Carmel Valley and Seaside aquifers. Each year a summary report of the raw water quality analyses completed during the year is sent to Cal-Am customers; the 1989 report is considered to be representative and is presented in Table 15-2. The surface water quality results indicate that concentrations fall below the maximum contaminant levels for all the constituents listed that have established water quality standards. In addition to the constituents listed in Table 15-2, Cal-Am has conducted monitoring for 164 additional organic chemicals for which the California Department of Health Services and the federal Environmental Protection Agency have not yet set levels. All results for 1989 were below detection levels.[1]

Cal-Am is currently conducting studies designed to determine the level of effort needed to bring the existing surface water treatment system at the Carmel Valley Filter Plant into compliance with new State drinking water regulations. The extent of structural or operational changes that may be implemented will be determined as a result of these studies In addition, Cal-Am is assessing the design and cost of new facilities that will be needed for surface and groundwater treatment in order to comply with recent federal drinking water regulations

As a regulated public utility, Cal-Am treats water to consistently meet State health standards. The surface water and groundwater resources are of varying quality, and require different types of treatment with varying costs. Some treatment is necessary for taste, odor or other aesthetic considerations.

The CVSIM model may be used to determine what percentage of production would be derived from various supply sources in normal years compared to drought years. This information is most valuable to determine potential differences in treatment costs. Water quality at the tap would be

TABLE 15-1

DAM/RESERVOIR DATA PERTINENT TO
DAM FAILURE ANALYSIS

Dam/Reservoir Alternative	Dam Type	Dam Height (feet)	Distance Upstream of Esquiline Bridge[1] (miles)
24 NLP	Gravity RCC	264	9.9
16 NLP/D	Gravity RCC	234	9.9
9 NLP/D	Gravity RCC	194	9.9
23 NSC	Gravity RCC	254	3.5
6 CAC/D	Zoned embankment or Concrete-faced rockfill	199	12.6
11 SCC	Gravity RCC	290	4.9
10 CHU	Zoned embankment	182	3.6
25 CAN	Zoned embankment	320	--[2]

[1] Esquiline Bridge is located near upstream (east) end of Carmel Valley Village at River Mile 14.45
[2] Cañada Dam site is located 0.8 mile north of Carmel Valley Road at about River Mile 4.9, approximately 9.5 mile downstream of Esquiline Bridge.

Source: MPWMD

TABLE 15-2

PRIMARY STANDARDS
Mandatory Health-Related Standards Established by the
State of California, Department of Health Services

Parameter	Units	Maximum Contaminant Level	Cal-Am System (1989) Surface Water Range	Surface Water Average	Groundwater Range	Groundwater Average
Clarity						
Turbidity	NTU	0.5	0.2-1	0.3	0.1-0.8	0.3
Microbiological						
Coliform Bacteria	% Tests Positive	10			0.0%-0.97%	0.48%
Organic Chemicals						
Total Trihalomethanes	mg/l	0.10	<0.0005-0.101	0.047	-	-
Endrin	mg/l	0.0002	NR	NR	NR	NR
Lindane	mg/l	0.004	NR	NR	NR	NR
Methoxychlor	mg/l	0.01	NR	NR	NR	NR
Toxaphene	mg/l	0.005	NR	NR	NR	NR
2, 4-D	mg/l	0.1	NR	NR	NR	NR
2, 4, 5-TP Silvex	mg/l	0.01	NR	NR	NR	NR
Atrazine	mg/l	0.003	NR	NR	NR	NR
Bentazon	mg/l	0.018	NR	NR	NR	NR
Benzene	mg/l	0.001	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Carbon Tetrachloride	mg/l	0.0005	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
1, 2-Dibromo-3-Chloropropane	mg/l	0.0002	NR	NR	NR	NR
1, 4-Dichlorobenzene	mg/l	0.005	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
1, 2-Dichloroethane	mg/l	0.0005	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
1, 1-Dichloroethylene	mg/l	0.006	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
1, 3-Dichloropropene	mg/l	0.0005	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Ethylbenzene	mg/l	0.680	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Ethylene Dibromide	mg/l	0.00002	NR	NR	NR	NR
Molinate	mg/l	0.02	NR	NR	NR	NR
Monochlorobenzene	mg/l	0.030	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Simazine	mg/l	0.01	NR	NR	NR	NR
1, 1, 2, 2-Tetrachloroethane	mg/l	0.001	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Tetrachloroethylene	mg/l	0.005	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Thiobencarb	mg/l	0.07	NR	NR	NR	NR
1, 1, 1-Trichloroethane	mg/l	0.200	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
1, 1, 2-Trichloroethane	mg/l	0.032	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Trichloroethylene	mg/l	0.005	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Vinyl Chloride	mg/l	0.0005	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Xylenes	mg/l	1.750	ND(<0.0005)	<0.0005	ND(<0.0005)	<0.0005
Inorganic Chemicals						
Aluminum	mg/l	1	ND(<0.1)	<0.1	ND(<0.1)	<0.1
Arsenic	mg/l	0.05	ND(<0.01)	<0.01	ND(<0.01)	<0.01
Barium	mg/l	1	ND(<0.1)	<0.1	ND(<0.1)	<0.1
Cadmium	mg/l	0.01	ND(<0.001)	<0.001	ND(<0.001)	<0.001
Chromium	mg/l	0.05	ND(<0.01)	<0.01	ND(<0.01)	<0.01
Fluoride	mg/l	1.4-2.4*	ND(<0.1)	<0.1	0.3-0.5	0.4
Lead	mg/l	0.05	ND(<0.005)	<0.005	ND(<0.005)	<0.005
Mercury	mg/l	0.002	ND(<0.001)	<0.001	ND(<0.001)	<0.001
Nitrate (as NO_3)	mg/l	45	ND(<1.0)	<1.0	<1.0-30	1.0
Selenium	mg/l	0.01	ND(<0.005)	<0.005	ND(<0.005)	<0.005
Silver	mg/l	0.05	ND(<0.01)	<0.01	ND(<0.01)	<0.01

TABLE 15-2 (Continued)

PRIMARY STANDARDS (Continued)
Mandatory Health-Related Standards Established by the State of California, Department of Health Services

Parameter	Units	Maximum Contaminant Level	Cal-Am System (1989) Surface Water Range	Surface Water Average	Groundwater Range	Groundwater Average
Radioactivity						
Gross Alpha Activity	pCi/l	15	0-1	0	0-2	1
Gross Beta Activity	pCi/l	50	NR	NR	NR	NR
Tritium	pCi/l	20,000	NR	NR	NR	NR
Strontium-90	pCi/l	8	NR	NR	NR	NR
Radium 226 and 228 combined	pCi/l	5	NR	NR	NR	NR
Uranium	pCi/l	20	NR	NR	NR	NR

SECONDARY STANDARDS
Aesthetic Standards Established by the State of California, Department of Health Services

Parameter	Units	Maximum Contaminant Level	Surface Water Range	Surface Water Average	Groundwater Range	Groundwater Average
Color	Units	15	<3-7	<3	ND(<3)	<3
Odor-Threshold	Units	3	<1-3	<1	ND<1	<1
Chloride	mg/l	500	10-15	11	40-140	70
Copper	mg/l	1.0	ND(<0.05)	<0.05	ND(<0.05)	<0.05
Foaming Agents (MBAS)	mg/l	0.5	ND(<0.05)	<0.05	ND(<0.05)	<0.05
Iron	mg/l	0.3	ND(<0.1)	<0.1	ND(<0.1)	<0.1
Manganese	mg/l	0.05	ND(<0.03)	<0.03	ND(<0.03)	<0.03
Sulfate	mg/l	500	26-30	26	70-120	80
Zinc	mg/l	5.0	0.5-1.0	0.7	0.5-1.0	0.7
Total Dissolved Solids	mg/l	1000	110-160	130	250-600	360

ADDITIONAL CONSTITUENTS ANALYZED

Parameter	Units	Maximum Contaminant Level	Surface Water Range	Surface Water Average	Groundwater Range	Groundwater Average
pH	Units	No standard	7.1-7.8	7.6	7.0-7.4	7.2
Hardness ($CACO_3$)	(mg/l)	No standard	90-120	100	170-300	200
Sodium	(mg/l)	No standard	10-25	15	40-100	60
Calcium	(mg/l)	No standard	20-30	25	40-80	50
Potassium	(mg/l)	No standard	2-3	2	2-5	3
Magnesium	(mg/l)	No standard	8-15	10	15-25	19

mg/l milligrams per liter (parts per million)
pCi/l picoC[illegible]s per liter
* Fluoride standard depends on temperature
ND() Not detected, detection level in parentheses
NR Monitoring not required by Health Department as of 12/31/89

similar for all alternatives, in terms of public health and safety, because all municipal supplies must be treated to meet the same state standards.

15.2 IMPACTS OF PROJECT OPERATION

SIGNIFICANCE CRITERIA

A project would generally be considered to have a significant effect on public safety if it were to pose an unacceptable threat to human lives or private property as a result of unsafe design, construction or operation. In addition, a project would be considered to have a significant adverse impact if it were to increase the downstream 100-year flood elevation by 1 foot or more, or if the quality of water delivered to consumers posed an unacceptable risk to public health by violating any applicable water quality standards.

15.2.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

Impact

15.2.1-1 **Catastrophic failure of the proposed New Los Padres Dam would result in the inundation of private property and possibly the loss of human life.**

Failure of the proposed New Los Padres Dam would be a very remote possibility, however, failure of the dam would cause significant damage in Carmel Valley. Dam failure could occur as a result of structural failure of the dam itself or its foundation. Structural failure could be promoted by groundshaking induced by seismic activity, the dam could be overtopped by a wave produced by a landslide, perhaps earthquake-induced, into the reservoir, or, damage or failure could result from overtopping and erosion during an extreme flood event.

The New Los Padres Dam site is located approximately 0.7 mile upstream of Princes Camp, a populated area near the confluence of Carmel River and Cachagua Creek. Failure of the New Los Padres Dam would severely impact Princes Camp and other nearby areas.

Existing dams located downstream of a proposed project are also subject to damage or progressive failure resulting from failure of the upstream dam. Thus, in a worst-case scenario, failure of the New Los Padres Dam could result in the failure of the existing San Clemente Dam, thus increasing the downstream flood volume. A flood wave originating at the New Los Padres Dam would follow

the Carmel River downstream, possibly causing failure of the existing San Clemente Dam, the flood wave would continue on down the Carmel River Valley for about 18 miles to the Pacific Ocean. This would be considered a significant adverse impact.

Mitigation Measures

15.2.1-1(a) *The procedures and requirements of the California Department of Water Resources, Division of Safe · of Dams, regarding the design, construction and operation of the proposed N Los Padres Dam shall be strictly adhered to. The engineering staff at the DSOD shall be consulted during final project design as to adequate safety measures to be incorporated into project design, construction and operation. During final design, determination of the PMF, the MCE and other safety-related design criteria shall be made.*

15.2.1-1(b) *In the event that this alternative is selected for implementation, a dam failure analysis shall be performed that delineates downstream areas that would be subject to inundation under a worst-case failure scenario. An Emergency Action Plan shall be prepared by the MPWMD in order to allow the evacuation of all downstream areas that would be at risk in the event of catastrophic dam failure.*

Impact

15.2.1-2 **Implementation of the 24 NLP alternative could result in a narrowing of the Carmel River channel below the dam and a subsequent increase in the extent of the 100-year flood plain.**

As discussed in Section 7.3, operation of the 24 NLP alternative could reduce the Carmel River channel capacity downstream of the dam. A reduction in channel capacity would result in an increase in water surface elevations during floods, thus posing an increased risk to residents and property downstream. Increases in downstream water surface elevations of one foot or more for the 100-year flood would be considered a significant impact to public health and safety. It should be noted, however, that exact prediction of future changes is rather speculative, with a number of variables entering into the analysis, the quantitative evaluation of each of the variables is subject to uncertainty. Therefore, because change in the 100-year flood elevations downstream of the proposed dam cannot be predicted with certainty, this impact must be considered potentially significant.

Mitigation Measure

15.2.1-2 *As described in Mitigation Measure 7.3-4, the MPWMD would monitor trends in channel capacity downstream of the project for an extended period of years. If a reduction in capacity is confirmed, MPWMD would initiate two procedures to restore channel capacity. Initially, the channel would be cleared of vegetation to approximately 60 feet wide. If this alone was not effective, it would be necessary to move sediment to clear the channel. This would be accomplished by physical removal (e.g., dredging or bulldozing). With these mitigation measures, the impacts are expected to be reduced to a less than significant level.*

Impact

15.2.1-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

Impoundment of water within any of the proposed reservoirs would result in the presence of naturally occurring dissolved organic substances in the water supply. These humic substances are derived from soil and decaying wood or vegetation. Upon chlorination, these humic substances react to form certain organic chemicals known as trihalomethanes, or THMs, the most common of which is chloroform.[2]

THMs are known to cause cancers in laboratory animals, although no definitive conclusions can be reached for their contribution to human cancers in small doses. The current limit for THMs in drinking water is 0.1 mg/l; this requirement applies to water systems serving over 10,000 people. The existing requirement may become more stringent (i.e., lower) in the future.

The THM-formation potential of the proposed reservoir would be highest in the first few years of operation as the inundated vegetation decays, and would gradually decrease over time. It is not anticipated that any long-term elevated levels of THMs would be present in the Cal-Am water supply. Because the water supply would be treated by Cal-Am to meet all applicable public health standards, this impact is considered less than significant.

Mitigation Measure

15.2.1-3 *It is recommended that the reservoir inundation area be cleared of vegetation and other organic debris as much as possible to reduce the THM-formation potential of the impounded water.*

Implementation of these mitigation measures would reduce the potential impacts to public health and safety to a level of insignificance.

15.2.2 16,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (16 NLP/D)

Impact

15.2.2-1 **Catastrophic failure of the proposed New Los Padres Dam would result in the inundation of private property and possibly the loss of human life.**

Potential dam failure mechanisms would be the same as described in Section 15.2.1. The impacts of failure of this alternative would be similar to those described above in Section 15.2.1 for the 24,000-AF New Los Padres project; however, because of the reduced volume of water storage associated with this alternative, the potential impacts in the event of catastrophic dam failure would be somewhat less than for the 24,000-AF New Los Padres alternative.

Mitigation Measure

15.2.2-1 *The mitigation measures presented in Section 15.2.1 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.2-2 **Implementation of the 16 NLP/D alternative could result in a narrowing of the Carmel River channel below the dam and a subsequent increase in the extent of the 100-year flood plain.**

This impact would be essentially the same as discussed in Section 15.2.1-2 for the 24 NLP alternative, although the degree of potential channel capacity reduction would be somewhat less because of the reduced size of the reservoir.

Mitigation Measure

15.2.2-2 *Mitigation measure 15.2.1-2 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.2-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

The effects on public health from THM consumption are discussed under Impact 15.2.1-3 for the 24 NLP alternative.

Mitigation Measure

15.2.2-3 *Mitigation measure 15.2.1-3 for the 24 NLP alternative would be applicable to this alternative also.*

Impact

15.2.2-4 **Consumption of desalinated ocean water would have no impact on public health.**

The desalination facility would be designed to produce potable water with a total dissolved solids (TDS) level of 300 milligrams per liter (mg/l) or less. The majority of the TDS would be sodium and chloride. By comparison, the TDS concentration for surface and ground water sources in the Cal-Am system ranges between 110 to 600 mg/L (Table 15-2).

Without post-treatment, desalinated seawater would have a TDS level of about 190 mg/l. Because of its lack of constituents such as calcium and carbonate, and its low pH, the water would be "aggressive" and would tend to corrode pipes or other surfaces unless post-treatment were provided. Post-treatment would be included by treating the product water with lime and allowing the desalinated seawater to be exposed to the atmosphere to provide bicarbonate alkalinity. In addition, the desalinated water supply would be treated so as to meet all applicable water quality standards. Therefore, the consumption of desalted seawater would be expected to have no impact on public health.

Mitigation Measure

15.2.2-4 *No additional mitigation would be necessary.*

15.2.3 9,000 AF NEW LOS PADRES RESERVOIR/DESALINATION (9 NLP/D)

Impact

15.2.3-1 **Catastrophic failure of the proposed New Los Padres Dam would result in the inundation of private property and possibly the loss of human life.**

Potential dam failure mechanisms would be the same as described in Section 15.2.1. The impacts of failure of this alternative would be similar to those described above in Section 15.2.1 for the 24,000 AF New Los Padres project, however, because of the reduced volume of water storage associated with this alternative, the potential impacts in the event of catastrophic dam failure would be somewhat less than for the 24,000 AF New Los Padres alternative.

Mitigation Measure

15.2.3-1 *The mitigation measures presented in Section 15.2.1 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative.*

Impact

15.2.3-2 **Implementation of the 9 NLP/D alternative could result in a narrowing of the Carmel River channel below the dam and a subsequent increase in the extent of the 100-year flood plain.**

This impact would be essentially the same as discussed in Impact 15.2.1-2 for the 24 NLP alternative, although the degree of potential channel capacity reduction would be somewhat less because of the reduced size of the reservoir.

Mitigation Measure

15.2.3-2 *Mitigation measure 15.2.1-2 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.3-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

This alternative would have a THM formation potential similar to that described under Impact 15.2.1-3 for the 24 NLP alternative.

Mitigation Measure

15.2.3-3 *Mitigation measure 15.2.1-3 for the 24 NLP alternative would be applicable to this alternative.*

Impact

15.2.3-4 **Consumption of desalinated ocean water would have no impact on public health.**

Desalinated sea water quality is discussed under Impact 15.2.2-4 for the 16 NLP/D alternative.

Mitigation Measure

15.2.3-4 *No additional mitigation would be necessary.*

15.2.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

Impact

15.2.4-1 **Catastrophic failure of the proposed New San Clemente Dam would result in the inundation of private property and possibly the loss of human life.**

Potential dam failure mechanisms would be the same as those described in Section 15.2.1. Failure of the proposed New San Clemente Dam would cause significant damage in Carmel Valley. In a worst-case situation, failure of the proposed New San Clemente Dam could be triggered by the failure of the existing Los Padres Dam, thus, the downstream flood progression would be exacerbated by the failure of both dams. The flood wave would travel down the Carmel River Valley for about 18 miles to the Pacific Ocean.

Mitigation Measure

15.2.4-1 *The mitigation measures presented in Section 15.2.1 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.4-2 **Implementation of the 23 NSC alternative could result in a narrowing of the Carmel River channel below the dam and a subsequent increase in the extent of the 100-year flood plain.**

This impact would be essentially the same as discussed in Impact 15.2.1-2 for the 24 NLP alternative, although this alternative would have a greater potential impact because of the larger tributary area of this alternative.

Mitigation Measure

15.2.4-2 *Mitigation measure 15.2.1-2 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also, although mitigation of this effect would involve greater effort and cost.*

Impact

15.2.4-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

This alternative would have a THM formation potential similar to that described under Impact 15.2.1-3 for the 24 NLP alternative.

Mitigation Measure

15.2.4-3 *Mitigation measure 15.2.1-3 for the 24 NLP alternative would be applicable to this alternative.*

15.2.5 6,000 AF CACHAGUA CREEK RESERVOIR/DESALINATION (6 CAC/D)

Impact

15.2.5-1 **Catastrophic failure of the proposed Cachagua Creek Dam would result in the inundation of private property and possibly the loss of human life.**

Potential dam failure mechanisms would be the same as described in Section 15.2.1. Failure of the proposed Cachagua Creek Dam would cause significant damage in Carmel Valley. In addition, the Cachagua Creek site is located approximately 3.5 miles upstream of Princes Camp, a populated area near the confluence of Carmel River and Cachagua Creek. Dam failure at this site would significantly impact Princes Camp and other nearby areas.

In a worst-case situation, failure of the proposed Cachagua Creek Dam could result in the failure of the existing San Clemente Dam, thus the downstream flood progression would be exacerbated by the failure of both dams. The flood wave would travel down the Carmel River Valley for about 18 miles to the Pacific Ocean.

Mitigation Measure

15.2.5-1 *The mitigation measures presented in Section 15.2.1 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.5-2 **Implementation of the 6 CAC/D alternative could result in a narrowing of the Carmel River channel below the dam and a subsequent increase in the extent of the 100-year flood plain.**

This impact would be essentially the same as discussed in Impact 15.2.1-2 for the 24 NLP alternative, although the degree of potential channel capacity reduction would be considerably less because of the reduced size of the reservoir and because this reservoir would be located on a tributary of the Carmel River rather than on the main stem. Therefore, the effects of this alternative on downstream channel capacity would be considered insignificant.

Mitigation Measure

15 2.5-2 *None necessary.*

Impact

15.2.5-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

The effects on public health from THM consumption are discussed under Impact 15.2.1-3 for the 24 NLP alternative.

Mitigation Measure

15.2.5-3 *Mitigation measure 15.2.1-3 for the 24 NLP alternative would be applicable to this alternative also.*

Impact

15.2.5-4 **Consumption of desalinated ocean water would have no impact on public health.**

Desalinated sea water quality is discussed under Impact 15.2.2-4 for the 16 NLP/D alternative.

Mitigation Measure

15.2.5-4 *No additional mitigation would be necessary.*

15.2.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

Impact

15.2.6-1 **Catastrophic failure of the proposed San Clemente Creek Dam would result in the inundation of private property and possibly the loss of human life.**

Potential dam failure mechanisms would be the same as described in Section 15.2.1. Failure of the proposed San Clemente Creek Dam would cause significant damage in Carmel Valley. In a worst-case situation, failure of the proposed San Clemente Creek Dam could result in the failure of the

existing San Clemente Dam, thus, the downstream flood progression would be exacerbated by the failure of both dams. The flood wave would travel down the Carmel River Valley for about 18 miles to the Pacific Ocean.

Mitigation Measure

15.2.6-1 *The mitigation measures presented in Section 15.2.1 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.6-2 **Implementation of the 11 SCC alternative could result in a narrowing of the Carmel River channel below San Clemente Dam and a subsequent increase in the extent of the 100-year flood plain.**

This alternative would have the greatest effect on channel capacity of all tributary reservoirs. The potential for reduction in channel capacity would be similar to that of the 9 NLP alternative, and would therefore be considered potentially significant.

Mitigation Measure

15.2.6-2 *Mitigation measure 15.2 1-2 for the 24 NLP alternative would be applicable to this alternative also, and would reduce impacts to less than significant levels.*

Impact

15.2.6-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

The effects on public health from THM consumption are discussed under Impact 15.2.1-3 for the 24 NLP alternative.

Mitigation Measure

15.2.6-3 *Mitigation measure 15.2 1-3 for the 24 NLP alternative would be applicable to this alternative also*

Implementation of these mitigation measures would reduce the potential impacts to public health and safety to a level of insignificance.

15.2.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

Impact

15.2.7-1 **Catastrophic failure of the proposed Chupines Creek Dam would result in the inundation of private property and possibly the loss of human life.**

Potential dam failure mechanisms would be the same as described in Section 15.2.1. Failure of the proposed Chupines Creek Dam would cause significant damage in Carmel Valley. A flood wave from the Chupines Creek site would travel approximately 0.8 mile to Tularcitos Creek, then about 1.4 miles along Tularcitos Creek and Carmel Valley Road to the confluence of Tularcitos Creek and the Carmel River, then approximately 15.8 miles down Carmel Valley to the Pacific Ocean There would be a backwater effect at the confluence of Chupines and Tularcitos Creeks, with some flooding and damage on Tularcitos Creek upstream of its confluence with Chupines Creek.

Mitigation Measure

15.2.7-1 *The mitigation measures presented in Section 15 2.1 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.7-2 **Implementation of the 10 CHU alternative would have no impact on the downstream channel capacity of the Carmel River.**

This alternative would have no effect on downstream channel capacity or flood elevations

Mitigation Measure

15.2.7-2 *None necessary.*

Impact

15.2.7-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

The effects on public health from THM consumption are discussed under Impact 15.2.1-3 for the 24 NLP alternative.

Mitigation Measure

15.2.7-3 *Mitigation measure 15 2.1-3 for the 24 NLP alternative would be applicable to this alternative also.*

Implementation of these mitigation measures would reduce the potential impacts to public health and safety to a level of insignificance.

15.2 8 25,000 AF CAÑADA RESERVOIR

Impact

15.2.8-1 **Catastrophic failure of the proposed Cañada Dam would result in the inundation of private property and possibly the loss of human life.**

Because this alternative would involve the construction of an off-stream storage reservoir, the risk of dam failure would be substantially reduced compared to the other alternatives.

Mitigation Measure

15.2.8-1 *The mitigation measures presented in Section 15 2.1 for the 24,000 AF New Los Padres Reservoir would be applicable to this alternative also.*

Impact

15.2.8-2 **Implementation of the 25 CAN alternative would have no impact on the channel capacity of the Carmel River below the diversion.**

As discussed in Section 7.4, the 25 CAN alternative would be expected to have little or no impact on the flood-carrying capacity of the Carmel River at or below the point of diversion.

Mitigation Measure

15.2.8-2 *None necessary.*

Impact

15.2.8-3 **Organic materials contained within the reservoir could, upon chlorination of the drinking water supply, form trihalomethanes (or THMs) in levels sufficient to affect public health.**

The effects on public health from THM consumption are discussed under Impact 15.2.1-3 for the 24 NLP alternative.

Mitigation Measure

15.2.8-3 *Mitigation measure 15.2.1-3 for the 24 NLP alternative would be applicable to this alternative also.*

15.2.9 7 MGD DESALINATION PLANT

Impact

15.2.9-1 **Consumption of desalinated ocean water would have no impact on public health.**

Desalinated sea water quality is discussed under Impact 15.2.2-4 for the 16 NLP/D alternative

Mitigation Measure

15.2.9-1 *No additional mitigation would be necessary.*

15.2.10 NO PROJECT

The No Project alternative would have no impacts on public health and safety, therefore, no mitigation is necessary.

15.3 IMPACTS OF PROJECT CONSTRUCTION

SIGNIFICANCE CRITERIA

A project would generally be considered to have a significant effect on public safety if it were to pose an unacceptable threat to human life or health as a result of unsafe construction practices. There always exists some unavoidable risk to workers and the public during the construction of large projects.

15.3.1 RESERVOIR ALTERNATIVES

Impact

15.3.1-1 **Dam construction would pose a threat to worker and public safety.**

There exists an inherent risk of injury or accident during the construction of a large project such as a dam. Worker health and safety is regulated by the California Occupational Safety and Health Association, or Cal OSHA, analysis of worker safety is beyond the scope of this document. The construction site could, however, pose a threat to the health and safety of unauthorized intruders.

The potential for fire would exist from vehicle or equipment accident or malfunction, or from blasting. The spillage of oils, fuels, or fluids used to operate vehicles or equipment within the construction and borrow sites could occur due to vehicular or equipment accident or malfunction, resulting in fire or contaminated soil and water. Traffic safety is discussed in Chapter 10, Traffic. Dam construction could therefore have a significant impact to public health and safety.

Mitigation Measures

15.3.1-1(a) *Controlled access to the construction site shall be maintained at all times as part of the site security plan.*

15.3.1-1(b) *Hard hats shall be required at all times, the construction contractor shall be required to follow a strict safety plan.*

15.3.1-1(c) *Construction vehicles and equipment accessing the site should undergo regularly scheduled maintenance.*

15.3.1-1(d) *All vehicles and equipment should be equipped with fire extinguishers and spark arrestors; fire extinguisher should also be available at strategic locations at the construction site.*

15.3.1-1(e) *The use of gasoline and gasoline engines should be minimized; diesel should be the primary fuel.*

15.3.1-1(f) *Welding, cutting and grinding should be conducted with the proper clearance of any flammable material, and with proper fire-fighting equipment nearby.*

15.3.1-1(g) *All electrical installations shall be designed and constructed to meet or exceed all applicable safety codes.*

15.3.1-1(h) *Telephone communications should be readily available to telephone fire-fighting authorities, if necessary.*

15.3.1-1(i) *All blasting materials shall be stored properly in a posted, segregated area.*

15.3.1-1(j) *Fuels and oils shall be stored in sealed tanks located in storage basins; the storage basins shall be lined with a plastic membrane and select backfill, and surrounded by protective dikes providing sufficient volume to contain any spills.*

Implementation of these mitigation measures would reduce the potential risks to public health and safety during project construction to a level of insignificance.

15.3.2 DESALINATION ALTERNATIVES

Construction of one of the desalination plant alternatives would pose no undue risks to public or worker health and safety over and above other projects of similar size, and no mitigation is necessary.

15.3.3 NO PROJECT

The No Project alternative would have no impacts on public health and safety.

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1. Cal-Am Water Company, 1989 Water Quality Report

2. American Water Works Association, Water Quality and Treatment, Fourth ed., 1990.

16. ENERGY

16.1 SETTING

16.1.1 INTRODUCTION

This section discusses the energy implications of the operation and construction of the various water supply alternatives. The available energy supplies are compared with the energy demands associated with the project alternatives. The energy demands of the alternatives are then assessed to determine if they would result in a significant adverse impacts.

16.1.2 REGULATORY BACKGROUND

Both the federal government and the State recognize the importance of energy conservation and have addressed the issue through legislation. The most encompassing energy legislation in the State is the Warren-Alquist Act. The Warren-Alquist Act, in effect since January 7, 1975, established the California Energy Resources Conservation and Development Commission (CEC) and gave it certain powers to certify power plants, conduct research and development of alternative energy sources, develop energy conservation measures, and, in general, consolidate various State functions related to energy resources. The Act goes on to state the following:

> The present rapid rate of growth in demand for electric energy is in part due to wasteful, uneconomic, inefficient, and unnecessary uses of power and a continuation of this trend will result in serious depletion or irreversible commitment of energy, land and water resources, and potential threats to the state's environmental quality. It is further the policy of the State and the intent of the California Legislature to employ a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption, prudently conserve energy resources, and assure statewide environmental, public safety, and land use goals.

The assessment of energy impacts are also addressed in the California Environmental Quality Act (CEQA), and provides that Environmental Impact Reports (EIRs) state the possible mitigation measures "to reduce wasteful, inefficient, and unnecessary consumption of energy."

Description of Energy and Conventional Sources

Energy is the capacity for doing work. There are several forms of energy, and one form may be changed to another, such as burning coal to produce steam to drive a turbine which produces electricity. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat. Energy is measured in terms of the work it is capable of doing. Electric energy is usually measured in kilowatt hours (kWH); natural gas in BTU's. BTU is an abbreviation for British thermal unit and is the quantity of heat necessary to raise the temperature of one pound of water one degree Fahrenheit. A kilowatt is a measure of power, or heat flow rate, and equals 3,413 BTU per hour.

Virtually every California community is dependent on three major types of energy: petroleum fuels, natural gas, and electricity. Of these three, oil and gas are considered "primary" sources of energy. Except for hydroelectric power, production of electricity requires the consumption of primary energy sources.

Petroleum Fuels. Petroleum fuels consist primarily of gasoline and diesel fuel for vehicles, fuel oils for industry and electrical power generation, and a variety of other liquid fuels, such as kerosene for jet fuel. Petroleum fuel is measured in gallons and contains approximately 12,500 BTU/gallon.

Natural Gas. Natural gas is usually produced in conjunction with oil production. Natural gas is measured in cubic feet and contains approximately 1,050 BTU/cubic foot.

Electricity. In contrast to oil and gas, most electricity is produced by "consuming" other resources. After these primary energy sources are converted to electricity, the electricity is transmitted through a vast network of transmission and distribution lines. The loss of energy at the power plant and transmission losses amount to about two-thirds of the energy required to supply electricity, with the

remaining one-third of the energy available for end-use by the consumer. Electricity is measured in kilowatt hours.

Energy Supply and Consumption

Supply. Pacific Gas & Electric (PG&E), servicing 94,000 square miles of Northern and Central California, is the utility supplying electricity and natural gas to the Monterey area. PG&E is dependent on a variety of energy sources to meet their energy demands. Table 16-1 shows the sources and volumes of electricity and natural gas produced by PG&E in 1990. In 1990, PG&E operated with a net peak electrical capacity of 21,397 MW and maintained a reserve margin of 10.3 percent above the peak demand.[1]

In 1989, 590.6 million barrels of petroleum products were supplied to California. Unleaded gasoline continually represents the largest component of petroleum products supplied at 41.9 percent. California's oil supply is provided almost equally from in-state and Alaska production and is expected to decline slowly over the next 20 years, forcing the State to import foreign oil to make up the difference and to meet increasing demand.[2]

Consumption. Table 16-2 reflects energy consumption of natural gas and electricity in the PG&E service area in 1990 for a variety of different classes of service. Within the PG&E service area, the average person consumes about 2.3 Megawatt Hours (MWH) of electricity per year.[3] The existing dams (San Clemente and Los Padres) consume a minimal amount of energy; the other sites are undeveloped and do not presently consume energy.

Oil supplies approximately 57 percent of California's energy. Industry depends on oil for approximately one-third of its energy consumption. Transportation depends on oil for almost 100 percent of its energy.[4]

California's transportation system is the biggest energy end-use in the State, consuming approximately 50 percent of the State's total energy. In the year 2004, on-road vehicles are projected to consume approximately 80 percent of California's transportation energy demand, a 10 percent increase from current demand.[5] Cars, trucks, and buses account for nearly all of the on-road fuel consumption, 90 percent of which is gasoline.[6]

TABLE 16-1

SOURCES OF ENERGY SUPPLIED BY PG&E IN 1990

Electricity	kWH (in millions)	MBTU[1] (in millions)	% of Total
Generated:			
Hydroelectric Plants:	8,008	82	4.5
Thermal-electric Plants:			
Fossil Fueled	24,496	251	13.8
Geothermal	7,324	75	4.1
Nuclear	16,274	166	9.2
Total Thermal Electric Plants	48,094	492	27.1
Wind Plants	–	–	–
Received from Other Sources:[2]	46,682	478	26.4
Total Gross System Output	102,784	1,050	58.0
Natural Gas	**MCF[3] (in thousands)**	**MBTU (in millions)**	**% of Total**
Purchased:			
From California:	77,935	82	4.5
From other States:	273,981	288	15.9
From Canada:	372,421	391	21.6
Total Purchased	724,337	761	42.0
Grand Total		1,811	100 0

[1] MBTU - An abbreviation for one million BTU's.

[2] Includes energy supplied through PG&E's system by the City and County of San Francisco for San Francisco's own use and for sale by San Francisco to its customers, by the Department of Energy for government use and sale to its customers and by the State of California for California Water Project pumping

[3] MCF - Million cubic feet.

Source. Pacific Gas & Electric, Form 10-K For the Fiscal Year Ended December 31, 1990.

TABLE 16-2

NATURAL GAS AND END-USE ELECTRICAL ENERGY CONSUMPTION IN THE PG&E SERVICE AREA IN 1989

Class of Service	Customers	kWH (in millions)	MBTU[1] (in millions)	% of Total
Electricity				
Residential	3,604,327	23,222	238	18.9
Commercial	440,670	25,867	265	21.1
Industrial	1,102	16,271	166	13.3
Agricultural	98,131	4,702	48	3.8
Public Street/Highway Lighting	14,979	376	4	0.3
Other Electric Utilities	20	3,619	37	3.0
Total	4,159,229	74,057	758	60.4

Class of Service	Customers	MCF[2] (in thousands)	MBTU[1] (in millions)	% of Total
Natural Gas				
Residential	3,214,424	204,433	215	17.1
Commercial	194,596	102,579	108	8.6
Industrial	2,154	133,930	141	11.2
Other Gas Utilities	16	31,604	33	2.6
Total	3,411,190	472,546	496	39.6
GRAND TOTAL			1,254	100.0

[1] MBTU - An abbreviation for one million BTU's.
[2] MCF - Million Cubic Feet

Source. Pacific Gas & Electric, Form 10-K For the Fiscal Year Ended December 31, 1990.

16.2 IMPACTS OF PROJECT OPERATION

STANDARDS OF SIGNIFICANCE

According to the CEQA Guidelines (Appendix G), a project would have a significant effect on the environment if it encourages activities that result in the use of large amounts of energy or uses energy in a wasteful manner. For the purposes of this EIR/EIS, it is assumed that a project would be considered to have a significant impact on energy consumption if it were to consume, on average, the equivalent of five percent or more of the existing residential power uses. Assuming a buildout population of 141,000 within the District boundaries and assuming that each person consumes about 2.3 MWH of electricity per year, a project that consumed an annual average of 16,200 MWH or greater would be considered to have a significant impact. Energy impacts related to project operation would require an on-going and dedicated source of energy for the life of the project.

16.2.1 RESERVOIR ALTERNATIVES WITHOUT PUMPED STORAGE (24 NLP/D, 16 NLP/D, 9 NLP/D, 23 NSC, AND 6 CAC/D)

Impact

16.2.1-1 **Operation of the New Los Padres, New San Clemente or Cachagua Dams would consume a minimal amount of energy.**

Operation of these reservoir alternatives would consume a minimal amount of energy for operation of the appurtenances (outlet valves, fish passage facilities, lighting, etc.) and for general maintenance. Fuel would be consumed by maintenance personnel visiting the dams. However, the amounts of energy consumed during the operation of these dams would be considered insignificant. It should be noted the 16 NLP/D, 9 NLP/D and 6 CAC/D alternatives would be combined with a 3 MGD desalination plant, the energy consumption of desalination is discussed below under Impact 16.2.3-1. The alternatives that would be associated with the lowest overall energy consumption would be 24 NLP and 23 NSC.

Mitigation Measure

16.2.1-1 *None required, however, it is recommended that the District purchase and use vehicles that have a high fuel efficiency, and inspect and maintain vehicles to ensure fuel efficiency.*

16.2.2 RESERVOIR ALTERNATIVES WITH PUMPED STORAGE (11 SCC, 10 CHU, 25 CAN)

Impact

16.2.2-1 **The pumped storage alternatives (11 SCC, 10 CHU, 25 CAN) would consume electrical power by pumping water to tributary and off-stream storage reservoirs.**

Construction and operation of one of the pumped storage alternatives (11 SCC, 10 CHU and 25 CAN) would commit the MPWMD to increased power consumption for the life of the project. In addition to the amount of power necessary for normal operation and maintenance of the dams, electric power would be necessary to pump water to off-stream and tributary storage reservoirs. The estimated power consumption of the pumped storage alternatives during wet, normal and critically dry years is presented in Table 16-3. Pumping demands (and therefore energy consumption) would tend to be higher during dry years. During normal years, the 11 SCC alternative would consume the electrical power of about 1,200 persons, the 10 CHU alternative would consume the power of about 2,300 persons, and the 25 CAN alternative would consume the power of about 3,200 persons. This would be considered a less than significant impact.

Mitigation Measure

16.2.2-1 *None required; however, Mitigation Measure 16.2.1-1 would be applicable to this alternative also.*

16.2.3 DESALINATION ALTERNATIVES

Impact

16.2.3-1 **Operation of the desalination alternatives would consume electrical energy.**

In the proposed desalination process, Reverse Osmosis (RO), energy is consumed in the application of pressure on sea water. The pressure exerted on the sea water forces the water through a membrane which does not allow the salt to pass through, thereby producing fresh water on the opposite side of the membrane. Fresh water may be produced in a two stage process, referred to as the first and second passes, with each successive pass further reducing the salt concentration of the water. Electricity is consumed in this process to drive electric motors which apply the pressure to the sea water. The first pass consumes the most energy, exerting approximately 1200 pounds per square inch (psi) upstream of the membrane. Downstream of the membrane the pres-

TABLE 16-3

ESTIMATED ENERGY CONSUMPTION
OF PUMPED STORAGE ALTERNATIVES[1]

Alternative	Water Year Type		
	Wet	Normal	Critically Dry
11 SCC	900	2,800	4,200
10 CHU	2,000	5,300	6,100
25 CAN	2,700	7,400	11,600

[1] All values are in megawatt-hours (MWH) per year for the given year type.

Source: EIP Associates

sure is only reduced by about 20 to 30 psi from the feed pressure of 1200 psi and consequently represents a valuable energy source. This energy may be captured by an energy recovery turbine (ERT) which is capable of recovering 25 to 30 percent of the energy required to drive the pumps in the first pass.

Desalination of sea water is an energy-intensive method of providing municipal water. It is estimated that it takes 6.05 megawatt-hours (MWH) of electricity to produce one acre-foot of potable water.[7] The estimated electrical power consumption of the 3 MGD and 7 MGD desalination plants in wet, normal and critically dry years is presented in Table 16-4. Based on the average residential energy consumption in the PG&E service area, during normal years, the 3 MGD desalination plant (operated in conjunction with the 16 NLP/D, 9 NLP/D, and 6 CAC/D alternatives) would consume the electric power of about 4,700 people, while the 7 MGD plant would consume the electrical energy of about 10,800 people. Based on the standards of significance presented above, the energy impact of the 3MGD desalination alternatives would be less than significant, while the energy consumption of the 7 MGD desalination alternative would be considered significant.

Mitigation Measure

16.2.2-1 *The desalination process should be designed to minimize energy consumption and maximize energy recovery. Alternative energy sources should be utilized to the extent possible (e.g., energy produced at the solid waste landfill near the MRWPCA plant site).*

Implementation of these mitigation measures would lessen the effects of desalination on energy consumption, but the energy impact of the 7 DSL alternative would remain significant and unavoidable.

16.2.4 NO PROJECT ALTERNATIVE

Well operation associated with the No Project alternative would consume a minimal amount of energy.

TABLE 16-4

ESTIMATED ENERGY CONSUMPTION
OF DESALINATION ALTERNATIVES[1]

Alternative	Water Year Type		
	Wet	Normal	Critically Dry
3 MGD[2]	8,300	10,700	18,000
7 MGD[3]	19,300	24,900	41,800

[1] All values are in megawatt-hours (MWH) per year for the given year type; assumes an energy input of 6.05 MWH per acre-foot.
[2] Values based on simulated conjunctive operation of 16 NLP/D, 9 NLP/D, 6 CAC/D alternatives as described in Chapter 4.
[3] Values based on simulated conjunctive operation of the 7 DSL alternative, as described in Chapter 4.

Source: EIP Associates

16.3 IMPACTS OF PROJECT CONSTRUCTION

16.3.1 RESERVOIR ALTERNATIVES

Impacts

16.3.1-1 **The construction of the reservoirs would consume energy for equipment and material transport, operation of construction equipment and processing of materials used in construction.**

Energy impacts related to project construction would require a one time energy expenditure and would not consume any additional energy after the construction phase of the project was completed. Energy would be consumed for a variety of different functions related to dam construction. Energy would be consumed by construction equipment required to haul construction materials and waste and for the excavation of t[illegible] foundation. Indirectly, energy would be consumed in the processing of construction materials, predominately concrete and steel used in the construction of the dams. Off-site transportation of workers, materials and equipment would constitute an additional energy expenditure related to the construction of the reservoirs. All of these factors have been accounted for and summarized in Table 16-5. Based on this analysis, the most energy intensive construction by far would be that of the 25 CAN alternative; the other alternatives would all consume an approximately equal amount of energy. Construction of the 25 CAN alternative would be extremely energy intensive because of the large amount of earthen materials that would need to be imported by truck. Therefore, construction of the 25 CAN alternative would have a significant impact to energy supplies because considerably less energy intensive alternatives are available.

Energy consumed for the construction of the remaining reservoirs would not use large amounts of energy or use energy in a wasteful manner and therefore this impact would be less than significant. Although energy consumption for the operation of the reservoirs would be a less than significant impact under CEQA, mitigation measures to further conserve energy are offered below These measures are being offered because of California's dependence on foreign oil; the related national security issues surrounding our dependence are of great public concern.

TABLE 16-5

RESERVOIR CONSTRUCTION ENERGY
(million kBTU)

Alternatives	Off-Site Transportation	Materials	Hauling and Excavation	Total
24 NLP	2	44	108	154
16 NLP/D	2	33	94	129
9 NLP/D	1	23	81	105
23 NSC	1	36	97	134
6 CAC/D	1	31	100	132
11 SCC	1	46	120	167
10 CHU	1	6	148	155
25 CAN	30	--	1,300	1,330

Source: EIP Associates

Mitigation Measure

16.3.1-1 *None available for the construction of the 25 CAN alternative, and none required for the remaining alternatives. However, energy consumption could be reduced through the use of energy efficient vehicles and regular inspection and maintenance.*

Construction of the 25 CAN alternative would consume a significant and unavoidable amount of energy, while construction of the remaining alternatives would consume a less than significant amount of energy.

16.3.2 DESALINATION ALTERNATIVES

Impact

16.3.2-1 **Construction of the desalination plants would consume energy for transport, operation of construction equipment and processing of materials used in construction.**

Construction of the desalination plant alternatives would result in the consumption of energy. This alternative may or may not result in a significant energy impact based on the quantity and energy intensiveness of the construction materials, the amount of foundation work and numerous other factors. The significance of this impact will be determined in a separate Desalination Project EIR.

Mitigation Measure

16.3.2-1 *None necessary at this level of analysis.*

16.3.3 NO PROJECT ALTERNATIVE

The No Project alternative would have not have a significant impact on energy. Energy consumption for this alternative would only be associated with the drilling of new wells.

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1. Pacific Gas and Electric Company, Form 10-K, For Fiscal Year Ended December 31, 1990, pg. 15.

2. California Energy Commission, Energy Agenda: 1989-1990 Biennial Report p. 12.

3. Pacific Gas and Electric Company, op. cit.

4. California Energy Commission, Conservation Report, October, 1988.

5. California Energy Commission, California Transportation Energy Demand. 1984-2004, April, 1985, p. 2.

6. Ibid, pp. 13-14.

7. Boyle Engineering Corporation, Desalination Feasibility Study, prepared for the MPWMP, July 1991.

17. LAND USE, PLANNING AND RECREATION

17.1 SETTING

The County general plan and zoning ordinance, together with existing built and open space characteristics of the environment, provide the context in which planning for the County of Monterey takes place. This setting section identifies Monterey County general plan land use and zoning designations of the eight reservoir sites and describes existing and proposed land uses at the reservoir sites. It also assesses general plan policies applicable to the various reservoir alternatives.

Three of the eight reservoir alternatives contain a 3 MGD desalination plant element. One alternative consists of a 7 MGD desalination plant. The MPWMD conducted a study regarding the feasibility of desalination, and two locations for the desalination project are being evaluated in a separate EIR. Therefore, analysis of the impacts associated with desalination, including land use impacts, are evaluated on a program level, general plan and zoning district designations for the two potential desalination facility sites are described, and freshwater output of the desalination facilities is accounted for in hydrologic assessments and flow requirement of the various alternatives. While some site specific characteristics are also described, coastal zone policies applicable to desalination facilities will be evaluated in the Desalination EIR. Comments on this document and on the Desalination EIR will be responded to in a joint Final EIR/EIS.

Finally, the relationship of the various alternatives to recreational resources is also addressed in this section because some of the alternatives are located in or adjacent to areas with recreational value

17.1.1 EXISTING LAND USE, ZONING AND FUTURE DEVELOPMENT

Land use within all unincorporated areas of Monterey County is regulated by the County General Plan, Area Plans and the County Zoning Ordinance. The Monterey County Planning Department,

and ultimately, the Board of Supervisors, are responsible for assuring implementation of the general plan, area plans and the zoning Ordinance.

In California, the General Plan is considered the "constitution" of land use regulation, all proposed development must conform with its provisions. Area Plans are typically sub-elements of the general plan and are more refined expressions of general plan policies and land use restrictions, they must retain overall conformity with general plan policies. The zoning ordinance is the most "fine grained" expression of general plan policies and provides detailed regulation of land use via provisions for issuance of use permits. Because the zoning ordinance must be shown to conform with the general plan prior to adoption, a project's compliance with applicable zoning is typically presumed to indicate compliance with the general plan. These elements of land use regulation are further described below.

Monterey County General Plan

All of the alternative sites are within Monterey County. The County's General Plan (September 1982) is the main planning policy document governing activity in the unincorporated areas of the County. The General Plan Land Use Element and Land Use Map specify permitted types and intensities of land use within the County. Other Elements of the Plan specify supplemental goals and policies designed to guide permitted development in the unincorporated areas of the County. Development within the alternative sites must be consistent with the overall County General land use designations and planning policies.

The County General Plan designates eight planning sub-areas that contain background data, planning strategies, and a land use plan based on the countywide General Plan, but tailored to the specific needs of the planning area The alternative sites fall into three of the sub-areas, Greater Monterey Peninsula Area Plan, Cachagua Area Plan and Carmel Valley Master Plan.

Greater Monterey Peninsula Area Plan

The Greater Monterey Peninsula Area Plan (GMP) is one of eight area plans of Monterey County that address local issues. The GMP must be consistent with the County General Plan. The GMP land use plan, however, supersedes the Countywide land use plan for this area. Three of the

alternative sites are partly within the planning sub-area, 25 CAN, 10 CHU, and 23 NSC. The 11 SCC alternative is entirely within the [illegible]MP Area.

Cachagua Area Plan

Two of the alternative sites are partly within the Cachagua Area Plan boundaries, 10 CHU and 23 NSC. The 24 NLP, 16 NLP/D, 9 NLP/D and 6 CAC/D alternatives are located entirely within the Cachagua planning area.

Carmel Valley Master Plan

The Carmel Valley Master Plan is a component of the 1982 Monterey County General Plan. The Plan includes most of the primary watershed of the Carmel River from Highway 1 to just east of Carmel Valley Village. The 25 CAN alternative site is partly within the planning area.

Monterey County Zoning Ordinance

The County Zoning Ordinance is the key land use regulatory mechanism. The Zoning Ordinance refines permitted land use within unincorporated portions of the County, consistent with the overarching provisions of the General Plan and any applicable Area Plans. Any proposed development with the County must conform to all regulations listed under the zoning ordinance. Any deviations from zone specifications would require a variance from the County Planning Department Ultimately, a County use permit is required for new uses and specifies the conditions under which the use may occur. The County may condition the use permit to assure conformity with all pertinent requirements of the Zoning Ordinance and with policies of the General Plan and Area Plans.

The following sections describe existing and proposed uses near the alternative project sites and applicable land use designations and zoning.

24,000 AF New Los Padres Reservoir (24 NLP)

Land uses within the 24 NLP project inundation area consist of approximately 273 acres of mostly undeveloped open space, and the existing Los Padres Reservoir (56 acres). All the acreage, including the existing reservoir, is owned by California-American Water Company (Cal-Am),

purveyors of water for the Monterey Peninsula. There is currently no residential development in the project area. Approximately four acres of the 273 acre inundation are presently in the Ventana Wilderness Area, which is managed by the U.S. Forest Service. However, a total of 23 wilderness acres would be affected by the project. In addition, there is a hiking trail and established campground, Bluff Camp, that would be within the inundation area. The hiking trail is used as a primary link to the Ventana Wilderness Area. Presently, fishing is allowed in the existing reservoir; however, only inflatable boats are allowed in the water. No water contact sports are allowed.

Surrounding the project site is generally undeveloped forested open space. The Wilderness Area stretches further south and adjacent to the project site. This area is undeveloped with some hiking trails and gravel and dirt roads. Cal-Am also owns some property to the south of the project site. Land use to the north includes very low density rural residential properties. East and west of the project site is mostly undeveloped land with some scattered rural residential use. No development has been proposed for the project site and surrounding area.[1]

The General Plan Land Use Designation for the 24,000 AF New Los Padres Reservoir site is Resource Conservation (RC), 2,300 acre minimum parcel size and Public/Quasi-public (PQ) (Cachagua Area Plan). The RC category is intended to ensure conservation of a wide variety of the County's resources while allowing for some limited use of these properties. Uses in resource conservation areas must be in keeping with the conservation intent of this category. The PQ category includes the existing reservoir. The County zoning designation for the inundation area is "N-2000 (rural) acre minimum building site" (i.e., no greater than one unit per 2,000 acres). (Zoning for the existing reservoir is "reservoir".)

<u>16,000 AF New Los Padres Reservoir and Desalination Plant (16 NLP/D)</u>

Land uses within the 16 NLP/D inundation area of approximately 225-acres would be similar to that described for the 24 NLP project. Surrounding land uses for the reservoir site are the same as those for the 24 NLP project site. No development has been proposed for the project site and the surrounding area. The County General Plan Land Use Designation of the 16,000 AF New Los Padres Reservoir site is Resource Conservation (RC), 2,300 acre minimum parcel size and Public/Quasi-public (PQ) (Cachagua Area Plan), as described under the 24 NLP alternative.

Zoning for the inundation area is "N-2000 (rural) acre minimum building site" (i.e., no greater than one unit per 2,000 acres).

The 3 MGD desalination plant would be located at one of two locations (see Figure 4-7). A preferred site for the desalination plant has not yet been identified. Land uses, land use designations and zoning on each potential site are described below:

- o PG & E Moss Landing Power Plant site. This site is currently in heavy industrial use as a power plant. The County General Plan Land Use Designation and zoning are the same: Heavy Industrial/Coastal Zone.

- o Monterey Regional Water Pollution Control Agency Treatment Plant site. This site is currently in use as a regional wastewater treatment plant. The Land Use Designation and zoning are the same: Public/Quasi-Public.

These two desalination project sites are being investigated further in a separate EIR.

9,000 AF New Los Padres Reservoir and Desalination Plant (9 NLP/D)

Land uses within the 156-acre inundation area consist of mostly undeveloped open space and the existing Los Padres Reservoir, but does not include any portion of the Ventana Wilderness. All of the acreage is owned by Cal-Am Surrounding land uses for the reservoir site are the same as those for the 24 NLP project site. No development has been proposed for the project site and the surrounding area The desalination plant land uses are described under the 16 NLP/D alternative.

The County General Plan Land Use Designation of the 9,000 AF New Los Padres Reservoir is Resource Conservation, 2,300-acre minimum parcel size (Cachagua Area Plan), as described under the 24 NLP alternative. Zoning of the inundation area is "N-2000 (rural) acre minimum building site" (i e., no greater than one unit per 2,000 acres). Zoning for the two alternative desalination sites is described under the 16 NLP/D alternative

The land use and zoning designations of the two alternative desalination plant sites are as described under the 16 NLP/D alternative.

23,000 AF New San Clemente Reservoir (23 NSC)

Land uses within the 306-acre inundation area include the existing dam and reservoir (30 acres) which are owned by Cal Am, cattle grazing land and undeveloped open space. There is no public access allowed in this area.

To the north of the reservoir site is a rural subdivision which consists of upscale houses on large lots. Surrounding the east, west and south of the site is undeveloped, rural land. No development has been proposed for the project site and the surrounding area.

The County General Plan Land Use Designation of the 23,000 AF New San Clemente Reservoir site is Resource Conservation 1,000-acre minimum parcel size (Cachagua Area Plan) and Agriculture, Permanent Grazing, 160-acre minimum parcel size (Greater Monterey Peninsula Area Plan). This agricultural land use sub-category is applied to those portions of the County in which exclusive grazing use is to be preserved, enhanced, and expanded. Zoning for the reservoir site is "N-10 acre minimum (rural)", part is unclassified.

6,000 AF Cachagua Creek Reservoir and Desalination Plant (6 CAC/D)

Land within the 109-acre inundation area is owned by several private parties. Most of the land is undeveloped open space, presently used for grazing. There are approximately seven vacation residences on large lots that would be inundated by the reservoir project. In addition, road relocation associated with the reservoir would require removal and purchase of three residences, a section of Cachaqua Road would also be inundated. There is no public recreation allowed in this area as all land is privately owned.

Land uses surrounding this site are mostly undeveloped rural areas with a few scattered residences located along the ridgelines and banks along Finch Creek. A four-lot subdivision is currently being proposed for development northwest of the project site above the proposed road relocation and south of Carmel Valley Road. The desalination plant alternative land uses are described under the 16 NLP/D alternative.

The County General Plan Land Use Designation of the 6,000 AF Cachagua Creek Reservoir site is Resource Conservation, 20-acre minimum parcel size (Cachagua Area Plan). Zoning for the reservoir site is "N-B6" and "N-10 acre minimum building site (rural) (reservoir)".

The land use and zoning designations of the two alternative desalination plant sites are as described under the 16 NLP/D alternative.

11,000 AF San Clemente Creek Reservoir (11 SCC)

Land uses within the 124-acre project site consist mostly of undeveloped open space. The upper end of the reservoir site would inundate a portion of a private recreational development that includes a recreation center, tennis courts, a pool, and a fish pond. Six to ten vacation residences which are located around the recreation area would be inundated by the reservoir. There is no public recreation in this area as all land is privately owned.

Land use surrounding this site is undeveloped open space. No development has been proposed for the project site and the immediate surrounding area. Development has been proposed for the 20,000-acre San Carlos Ranch, which is in the vicinity of the project.

The County General Plan Land Use Designation of the 11,000 AF San Clemente Creek Reservoir site is Agriculture, Permanent Grazing (Greater Monterey Peninsula Area Plan). Zoning of the site is "N-10 acre minimum building site (rural)"; part is unclassified.

10,500 AF Chupines Creek Reservoir (10 CHU)

Land use within the 173 acre inundation area consists of a private ranch which is an agricultural preserve under the Williamson Act. The Williamson Act allows owners of agricultural land to exchange reduced property taxes for a commitment not to develop their agricultural land. The ranch is used for cattle grazing and some cultivation of hay. There are two houses and several ranch buildings on the property which would be inundated by the reservoir project. In addition, three residences would be affected by the reservoir and would require purchase by the project sponsor. Two of the three residences are ranches which would lose a substantial agricultural area to the reservoir and therefore would not be economically viable. The remaining residence would

be located downstream in a low lying area from the reservoir. There is no public recreation in this area as all land is privately owned.

Surrounding this project site is undeveloped forested open space with a few scattered rural residences. No development has been proposed for the project site and the surrounding area.

The County General Plan Land Use Designation of the 10,500 AF Chupines Creek Reservoir is Agriculture, Permanent Grazing, 160-acre minimum parcel size (Cachagua Area Plan) and Agriculture, Permanent Grazing, 40-acre minimum parcel size, (Greater Monterey Peninsula Area Plan). Zoning of the reservoir site is AP-V, (agricultural preserve/mobile home exclusion).

25,000 AF Cañada Reservoir (25 CAN)

Land uses within the project site include undeveloped steep land. Three land owners would be affected, however, there is no residential development on the site. There is no public recreation allowed on this site as all lands are privately owned.

Immediately north of this site is an approved subdivision of 283 single family homes which is proposed for development in the next five years. South of the site is some rural residential development. To the east is vacant undeveloped land, further east is a subdivision. West of the site the land consists of mostly open space, agricultural and residential land. A subdivision has been proposed for the project site and the surrounding area.

The County General Plan Land Use Designation of the 25,000 AF Cañada Reservoir is Rural Density Residential, 10 acres per unit (Greater Monterey Peninsula Area Plan) and Low Density Residential, 2.5 acres per unit (Carmel Valley Master Plan). Zoning of the reservoir site is T-V-B-4, Rural Density Residential 10 acres/unit (Greater Monterey Peninsula Area Plan).

7 MGD Desalination Plant (7 DSL)

Under this alternative, the desalination plant would be constructed at one of the two locations described for the 16 NLP/D alternative; the land use and zoning designations of the two alternative desalination plant sites are as described under the 16 NLP/D alternative.

No Project Alternative

Land use would remain as it is presently.

17.1.2 PLANS AND POLICIES

In addition to identifying permitted types and intensity of land use, the County General Plan, and the Area Plans, contain policies which further define the characteristics of permitted uses. Area Plan policies that have the greatest general bearing on additional development in the alternative sites above are shown in Table 17-1.

Local Coastal Programs.

A key objective of the local coastal program is to transfer to local coastal governments the responsibility for issuing coastal development permits. Each jurisdiction along the Coastal Zone develops a Local Coastal Plan (LCP) which is then approved by the State Coastal Commission Once the LCP is approved, the jurisdiction is authorized to issue these permits. Any development within the coastal zone must obtain a coastal development permit.

The PG&E Moss Landing desalination site lies within the coastal zone and a Coastal Development Permit would be required if this site is selected. A permit would also be needed for the radial wells that would supply the MRWPCA site with seawater.

17.2 IMPACTS OF PROJECT FACILITIES

In order to evaluate land use impacts to surrounding properties, the following factors have been considered in the analysis. The reservoir alternatives would involve construction of a dam and appurtenant structures. Construction of the dams would take from two to four years, which includes time estimated for clearing the inundation areas and construction of the dam structure At times, dam construction would require 24 hour per day shifts Clearing and grubbing of the reservoir area would occur during the first year of construction.

TABLE 17-1: RELEVANT AREA PLAN POLICIES

Greater Monterey Peninsula Area Plan Policies

Open Space Conservation

1.1.3 The County shall take comprehensive measures to ensure protection of sensitive and highly sensitive scenic areas as shown on the Greater Monterey Peninsula Visual Sensitivity Map.

Geology, Minerals and Soils

3.1.1.1 Erosion control procedures shall be established and enforced for all private and public land clearing projects.

Vegetation and Wildlife Habitats

7.1 3 In recognition of its status as a threatened resource, its function as riparian habitat and its important role in watershed protection, redwood forest habitat should be retained as open space through conservation easements or, where necessary, fee acquisition.

7.1.4 Redwood forest and chaparral habitat on land exceeding 30 percent slope should remain undisturbed due to potential erosion impacts and loss of visual amenities.

7.1 5 In recognition of their function as important habitat for many wildlife species and their contribution to scenic resources within the Planning Area, coastal and interior wetlands should be retained as open space through conservation easements or, where necessary, fee acquisition.

7 1.6 A setback of 100 feet from all wetlands shown on Environmentally Sensitive Areas Map shall be provided and maintained in open space use. No new development shall be allowed in this setback area. No landscape alterations will be allowed in this setback area unless accomplished in conjunction with a restoration and enhancement plan approved by the California Department of Fish and Game.

9.1.1.1 Open space areas should include a diversity of habitats with special protection given to ecologically important zones such as areas where one habitat grades into another and areas used by wildlife for access routes to water or feeding grounds.

11.1.6 Environmentally sensitive areas as shown on the GMP Environmentally Sensitive Areas Map should be preserved as open space. When an entire parcel cannot be developed because of this policy a low intensity, clustered development may be approved. However, the development should be located on those portions of the land least biologically significant.

Table 7-1 (Continued)

Public Services and Facilities

51.2.4.1 Each development proposal shall be evaluated to determine the extent to which such development may help further the County's park and recreation facility goals, objectives and policies.

Cachagua Area Plan

Policies listed in the Area Plan are supplemental to the goals, objectives and policies of the countywide General Plan. Area Plan policies that have the greatest general bearing on additional development in the alternative sites above include the following:

Vegetation and Wildlife Habitats

8.2.2 The removal of native trees shall be discouraged and shall be allowed only under the following conditions:

1. in conjunction with an approved timber harvest plan, or

2. in conjunction with an approved agricultural management plan, or

3. in conjunction with an approved discretionary permit application, or

4. with administration permit approval for removal of 4 or more trees with a trunk diameter in excess of 6 inches, measured two feet above ground level, on any given parcel in any twelve month period, or

5. in emergency situations caused by the hazardous or dangerous condition of a tree, provided that the County is notified of the removal within ten working days.

A minimum fine, equivalent to the retail value of the wood removed, shall be imposed for each violation. Exemptions shall include tree removal by public utilities, as specified in the California Public Utility Commission's General Order 95.

9.2.2.1 A proposed new San Clemente Dam may impact the Carmel River steelhead spawning areas that are located in the proposed reservoir inundation area. The County should work with the appropriate agencies to provide similar nursery habitat within the Planning Area. Such habitat would provide fry with the ability to migrate to lower portions of the Carmel River.

9.2.3 The County should work with the Department of Fish and Game to ensure that the fishery located above the Los Padres Dam is maintained in a productive state.

Table 7-1 (Continued)

9.2.4 Fishery habitat located above the San Clemente Dam should be accessible to fish populations, especially steelhead.

9.2.5 The County should work with the appropriate agencies to develop a water supply system that will be sufficient to allow fish populations ingress and egress to all portions of the Carmel and Arroyo Seco Rivers throughout the year. This system would also consider provisions to allow fish populations to pass over river obstructions.

9.2.6 Major project proposals that impact areas of critical steelhead habitat in the riparian corridor should enhance the habitat.

9.3.1 The County should work with the California Department of Fish and Game to ensure that the fishery located above Los Padres Dam is maintained and is open to fishing during the appropriate season and in the appropriate locations.

9.3.2 The County should work with the Department of Fish and Game to ensure that established fishing locations above Los Padres Dam are available to the general public during the fishing season as long as such use does not threaten any endangered fish species.

Archaeological Resources

12.1.7.1 The discovery of archaeological, historic, ethnographic or ethnohistoric sites will be followed by procedures which employ project modification, relocation or on-site mitigation measures appropriate to the location, significance of the find and potential impacts of development.

Flood Hazards

17.2.12 Dam construction should be undertaken only in areas where the risk of loss of life or property damage due to dam failure is low.

Water Quality

21.1 Protect and enhance surface and groundwater quality by implementing current adopted water quality programs and by continuing to evaluate new problems.

General Land Use

26.1.6.2 The local citizens advisory committee should review all project proposals to assess the visual impacts of projects on the viewshed of the Planning Area. This viewshed consideration should be a required recommendation to the Planning Commission.

26.1.26 The visible alteration of natural landforms caused by cutting, filling, grading or vegetation removal shall be minimized through sensitive siting and design of all improvements and maximum possible restoration.

Table 7-1 (Continued)

26.1.27 Every attempt should be made to minimize hillside scarring by avoiding cuts and fills where possible. Where cuts and fills are unavoidable slopes shall be revegetated. Permanent nonrevegetated scarring of hillsides is strongly discouraged and should occur only if no other reasonable alternative is available and if adverse impacts can be mitigated.

Public/Quasi-Public

32.1.4 Land uses adjacent to the Ventana Wilderness shall not impact the purpose of the wilderness areas.

Road and Highway Transportation

39.3.4 The County shall require that any major timber, mining, or public works projects incorporate features, such as flagpersons, signs, or warning lights, into the project to ensure the safety of persons using public roads.

39.3.5 The County shall require that any major timber, mining or public works projects that use heavy vehicles on public roads restore such roads to the pre-project level.

Scenic Highways

40.1.2 To enhance and maintain sensitive visual resources, the County shall pursue measures to designate Carmel Valley Road as a scenic County route.

Park and Recreation Facilities

51.1.5 The dedication of recreational trail easements shall be encouraged where appropriate either for establishing a planned Cachagua trails system, or where an established trail is jeopardized by impending development.

Carmel Valley Master Plan

Policies listed in the Area Plan are supplemental to the goals, objectives and policies of the countywide General Plan. Area Plan policies that have the greatest general bearing on additional development in the alternative sites include the following:

Geology, Minerals, and Soils

3.1.5 The amount of land cleared at any one time shall be limited to the area that can be developed during one construction season. This prevents unnecessary exposure of large areas of soil during the rainy season.

Vegetation and Wildlife Habitats

7.1.3 Development shall be sited to protect riparian vegetation, minimize erosion, and preserve the visual aspects of the river. Therefore, development shall not occur within the riparian corridor. In places where the riparian vegetation no longer exists, it should

Table 7-1 (Continued)

be planted to a width of 150 feet from the river bank, or the face of adjacent bluffs, whichever is less. Density may be transferred from this area to other areas within a parcel.

7.2.1.1 In order to preserve soil stability and wildlife habitat, the chaparral community shall be maintained in its natural state to the maximum extent feasible consistent with fire safety standards.

7.2.2.1 Botanically appropriate species shall be used for required landscaping and erosion control.

Archaeological Resources

12.1.8.1 Archaeological surveys are required within the three sensitivity zones as follows:

High and Potentially High Sensitivity Zones: All permit applications which include earth disturbing or earth altering activities (including but not limited to grading permits, utility and other excavations, foundation trenching and land leveling, etc.) shall be preceded by a cultural resources reconnaissance.

Low Sensitivity Zones: All major projects or projects otherwise requiring preparation of an EIR shall be preceded by a cultural resources reconnaissance. Construction of or addition to single-family dwellings and other minor projects shall not be required to conduct a cultural resources reconnaissance.

General Land Use

26.1.21 It is intended that the Carmel Valley remain rural residential in character.

Public/Quasi-Public

31.1.4 Facilities (such as sewage treatment facilities, solid waste disposal facilities, water storage tanks, pumping stations, power and communications substations) shall be subject to design control and shall be screened form public view by use of natural terrain and vegetation or buffer areas and artificial screening.

STANDARDS OF SIGNIFICANCE

Land Use

The CEQA Guidelines indicate that a project will normally have a significant adverse land use impact if it would conflict with adopted land use plans and zoning ordinances of the community where the project is located. For purposes of this Draft EIR/EIS, the following are considered potentially significant Land Use and Planning conflicts: 1) A proposed use that could not be approved by the local agency (within its permitted discretion) in the zoning district or for the General Plan land use designation in which it is proposed to be located; 2) a proposed project that results in the conversion of open space into urban- or suburban-scale uses; 3) a proposed project that results in a use substantially incompatible with surrounding existing uses; and 4) the loss of one or more private residences. For purposes of this EIR, a zoning ordinance "currently in effect" refers to an ordinance in effect on the beginning date of the public review period for this Draft EIR. Land use impacts identified for each alternative site are set forth below.

Recreation

The project would create a significant impact on recreation if the project precluded the use of established recreational facilities. Existing diversions and groundwater pumping has have eliminated year-round stream flow. This implies that existing levels of instream recreational benefits are already significantly impacted. Additional impacts are occurring to riparian vegetation critical to overall recreational values of the lower river, continuation of present conditions will eventually destroy much of these existing values. Therefore, for the purposes of this Draft EIR/EIS, "preclusion of established facilities" would occur under alternatives that do not improve stream flows and substantially enhance long-term survival of riparian vegetation.

Although not required by CEQA, some less than significant adverse impacts, or beneficial effects, are discussed because they are general issues of local concern. For instance, some alternatives would improve stream flow in summer months, resulting in improved recreational opportunities that are responsive to various land use policies. These effects are reviewed. Significant impacts are distinguished in the text from beneficial and less than significant impacts.

POLICY CONFORMITY

Limitations of Consistency Determinations of the District.

Policy documents present analytic difficulties in the context of CEQA and NEPA environmental evaluation. These laws, and their implementing regulations, are primarily concerned with identification of tangible environmental and socio-economic impacts. Policy analysis on the other hand, is concerned with identification of whether a specific project proposal in "consistent" with established policies. In California, projects may not be approved which are inconsistent with general plan, or area plan policies; permits issued to inconsistent projects are illegal.

The difficulty is that only the agency responsible for implementation of policy documents may interpret a project's compliance. These agencies are frequently not the Lead Agency for project evaluation under CEQA. This is the case with the present project: under CEQA, the District must determine whether the proposed project would generate significant environmental impacts, inconsistency with the Monterey General Plan (and Area Plans) is defined as a "normally significant" project impact. However, only the Monterey County Planning Commission and/or the Board of Supervisors may make general plan consistency determinations.

Another important analytic difficulty is that the project must be consistent with the general plan, inconsistency is not permissible. Therefore, none of the alternatives would be allowed to generate an "inconsistency impact", in the event of an inconsistency, either the project or the policy would have to be amended prior to approval by Monterey County and issuance of necessary County permits.

These contradictions in the policy evaluation process may be dealt with in the following manner. Under CEQA, the Monterey County Planning Department is considered a Responsible Agency with respect to project review and approval. This means the Planning Department must eventually issue grading, construction and use permits (among others) in order for the District to proceed with the project. This EIR/EIS will be used by the Department to evaluate whether environmental and policy impacts of its permit issuance would be significant, and if so, whether suitable mitigation is provided as part of the project. If the District's evaluation of these issues, as reported in the Supplemental Draft EIR/EIS, does not adequately address the Department's concerns, it is obligated to comment on this fact. If the District's response to comments of the Department still

fail to resolve the Department's concerns, then the Department is obligated to make separate findings regarding the issues and to impose permit conditions as mitigation measures.

General Plan Policy Conclusions of the District.

All of the facilities associated with each of the alternatives represent Public/Quasi-Public uses. Public/Quasi Public uses represent one of the highest uses to which land may be dedicated because they directly foster the public's health and welfare. These uses are permitted uses within all land use designations and zoning districts of the County (Monterey County Zoning Ordinance, Title 20, Section 20.46.030). This represents substantial evidence that each of the alternatives conform with the Monterey County general plan, area plans and zoning ordinance.

Although they are permitted uses of very high public value, elements of the alternatives, including borrow pits, roads, reservoirs and desalination facilities, must also comply with other policies whose intent is to conform public use facilities as greatly as possible with the character of existing, surrounding land uses and with established land use designations and zoning districts. The policies listed in Table 17-1, above, represent evidence of an investigation of the most pertinent policies.

It appears that the policies of the general plan generally seek to assure that water facility uses will:

- maintain and enhance the existing open space characteristics of affected undeveloped or minimally developed alternative locations,
- preserve and enhance fisheries values of the Carmel River watershed, especially relating to riparian access and riparian corridor habitat, and,
- preserve and enhance passive and active, instream and upland recreational values of the Carmel River watershed.

The District's planning process assures responsiveness to these broad goals. Reliance on programmatic analysis of the water supply alternatives will assure adequate evaluation of potential impacts and identification of appropriate mitigation measures. These programmatic analyses are fully assessed in the topical sections of the main body of this document and will not be re-elaborated in this Chapter. However, an example of an environmentally protective "programmatic goal" would include the District's use of "by-pass logic" developed by the California Department of Fish & Game This logic was used to determine optimum system operational conditions and

permissible diversion levels of each alternative consonant with enhancement of Carmel River fisheries values.

State CEQA Guidelines Section 15091, provides that, for mitigation, the District may rely upon permitting authority of the host of Responsible Agencies with whom the District has consulted throughout the project planning and environmental review process. Permitting authority of these agencies is adequate to assure that programmatic goals will be met through precise conditioning of construction and operations permits. For instance, County policies specify that removal of native trees in the Cachaqua Area can only occur after preparation and submission of a timber harvest plan for County approval. The District may reasonably rely upon the County to assure implementation of this policy through conditioning of grading permits. Consequently, a detailed elaboration of the possible contents of such a harvest plan would not further the policy evaluation objectives of the CEQA process. Similarly, the District believes that the Corps "404 Permit" process, and "Section 1601" Streambed Alteration Agreements negotiated with the Department of Fish & Game, will be adequate to assure minimization of fisheries impacts and maximization of watershed enhancement.

RECREATION AND LAND CONVERSION

The various alternatives have differential effects on recreational benefits. Upper river benefits are mostly associated with creation of new or expanded recreational opportunities related to the various reservoirs. Because the reservoirs are a public water source, none of these benefits include water contact recreation, and frequently, they would be limited to passive activities Also, public benefits often are achieved only at the expense of private land conversion, considered to be significant, unavoidable land use impacts. These issues are discussed for each alternative in order to help the reader gauge the relative net benefits.

Some alternatives would also improve recreational opportunities in lower river segments and at the Carmel Lagoon. Lower river benefits would mostly result from the 24,000 and 16,000 AF New Los Padres, the 23,000 AF New San Clemente, the 11,000 AF San Clemente Creek, and, the 10,000 AF Chupines Creek alternatives. The 9,000 AF New Los Padres, 6,000 AF Cachaqua Creek, and the 25,000 AF Canada alternatives would have significant lower river impacts because they provide substantially less than year-round instream flows. Also, due to high pumping requirements, these alternatives (except the 25,000 AF Canada alternative) barely improve, or adversely impact riparian

corridor vegetation which is already in decline. The 7,000 MGD Desalination and No Project alternatives provides no reservoir benefits and few if any lower river improvements. These issues are reviewed below, for each alternative.

17.2.1 24,000 AF NEW LOS PADRES RESERVOIR (24 NLP)

The 24 NLP project would maintain and improve passive recreation use of the reservoir area, such as hiking, and enhance instream recreational opportunities downstream of the reservoir. This is considered a beneficial impact. Additional land in the area would be open to public use for passive and active recreational activities. It is proposed that the recreational activities allowed at the existing Los Padres Reservoir would continue, including hiking, equestrian use, sightseeing, picnicking, and fishing upstream of the dam. It is assumed that fishing would continue to be prohibited by the Department of Fish and Game between the new dam and San Clemente Dam. Boating, in non-inflatable craft and swimming and camping at the reservoir area would be prohibited, as would all motorized activities. Access to the Ventana Wilderness would be maintained via the proposed access road on the west side of the Carmel River between Cachagua Road and the fish screening facility at the upstream end of the reservoir.

Downstream effects to recreational activities are difficult to quantify. Presently, low or absent summer flows adversely affect recreational opportunities in the lower river and lagoon. With this alternative, flows to the lagoon would occur throughout the summer months, however, recreational use would be dependent upon actual flows and the public's perception of appropriate uses for the increased water flow. The lagoon volume and area would be increased, which would improve common recreational opportunities such as swimming and wading, sailboarding and birding Thus the overall impact would be beneficial.

Although, on balance, effects of the 24 NLP alternative would be beneficial, some significant adverse effects would also result. All adverse impacts could be mitigated to less than significant levels.

Impact

17.2.1-1 **The 24 NLP project would impact approximately 23 acres of the Ventana Wilderness Area; this would be a significant impact.**

Filling of the reservoir would inundate four of the affected 23 acres at the northern edge of the Wilderness Area. The other acres would be used for access roads and buffer zones.

In November 1990, President Bush signed Public Law 101-539, which allows the Ventana Wilderness land exchange. The MPWMD would donate 140 acres with high quality wilderness value in exchange for the 23 acres which would be affected by the New Los Padres project.

Mitigation Measure

17.2.1-1 *An exchange of 140 acres of private land adjacent to the Wilderness boundary for the affected 23 acres has been approved by the President. This would reduce the impact to a less than significant level.*

The Ventana Wilderness land exchange was approved by President Bush under Public Law 101-539. The exchange would occur only if the New Los Padres project is selected as the overall preferred alternative in the Final EIR/EIS and is issued permits from federal and State agencies prior to the start of construction. If the New Los Padres project is not selected or approved, the land exchange will not occur.

Impact

17.2.1-2 **The 24 NLP alternative would inundate a public recreational trail and camping area.**

The hiking trail which would be affected is part of an established trail system which stretches from the Ventana Wilderness Area through the Carmel River Canyon. The camping area is the only established site in the Los Padres Reservoir area. Loss of this trail and camping area would be considered significant.

Mitigation Measure

17.2.1-2 *The hiking trail would be rebuilt to parallel the existing trail outside the inundation area. A campsite similar to Bluff Camp should be established near the camp's original location for hiking use. This would reduce the impact to a less than significant level.*

17.2.2 16,000 AF NEW LOS PADRES RESERVOIR AND DESALINATION PLANT (16 NLP/D)

Recreational benefits an impacts of the 16 NLP/D alternative would be similar impacts to those under the 24 NLP alternative. However, stream flows to the Carmel Lagoon would only occur for eight months during critically dry years. Lesser inundation of Wilderness lands would occur.

17.2.3 9,000 AF NEW LOS PADRES RESERVOIR AND DESALINATION PLANT (9 NLP/D)

The 9 NLP/D project would increase the size of the existing Los Padres Reservoir but would not impact the Ventana Wilderness Area. This is considered a beneficial impact. Recreational opportunities in the reservoir area would be enhanced as would occur under the 24 NLP alternative, additional land in the area would be open to public use for passive recreational activities, and again, no water contact would be allowed.

Impact

17.2.3-1 **The 9 NCP/D reservoir project would reduce stream flow and cause reduction of riparian vegetation.**

Analyses show that the 9 NLP/D alternative reduces stream flow of the lower Carmel River and results in some reduction of riparian vegetation. These impacts are considered significant. Stream flow at the Lagoon under the 9 NLP/D alternative would be slightly below the No Project condition during normal years, no flows would be expected during six months of a normal year (i.e., during the summer and autumn months corresponding with maximum recreational activity at the Lagoon). This is one month less than the No Project condition During critically dry years, stream flow would cease for up to nine months of the year, the same as No Project conditions (see Figure 7-6 and 7-7, in Chapter 7)

Mitigation Measure

17.2.3-1 *The MPWMD would implement the Riparian Corridor Management Plan and Program. However, stream flow would still be inadequate to support instream recreational uses and decline of riparian vegetation would most likely continue. These impacts are therefore considered significant and unavoidable impacts.*

Implementation of the District's Riparian Corridor Management Plan and five year mitigation program would probably yield some improvement of lower river vegetation resources. However,

these efforts would be localized and could not replicate beneficial effects of improved groundwater conditions which would result from permanent improvement of river flow conditions and aquifer recharge. Therefore, because ongoing impairment of recreational benefits of the river would continue even after mitigation, recreational impacts of this alternative would be significant and unavoidable.

17.2.4 23,000 AF NEW SAN CLEMENTE RESERVOIR (23 NSC)

The 23 NSC project would create new passive recreation use at the reservoir area, such as hiking, and enhance instream recreational opportunities downstream of the reservoir. This is considered a beneficial impact. The existing San Clemente Reservoir is on private land, owned by Cal-Am, and as such, public access is prohibited The New San Clemente Dam and Reservoir would be publicly owned, and passive, daytime recreation would be allowed, similar to uses described for the 24 NLP alternative.

Also, as described for the 24 NLP alternative, under the 23 NSC alternative, the Lagoon would experience year-round flows during both normal and critically dry years and, therefore, instream recreational opportunities downstream of the new dam would be substantially enhanced.

17.2.5 6,000 AF CACHAGUA CREEK RESERVOIR / DESALINATION (6 CAC/D)

The 6 CAC/D project would create new opportunities for passive recreation uses at the reservoir area, such as hiking, for public use. The 6 CAC/D alternative would inundate land that is now privately owned. The Cachagua Creek Reservoir would be publicly owned and open to the public for passive, daytime recreational use. Boating, swimming, fishing and camping at the reservoir would be prohibited, as would motorized vehicles. While take of private lands is a significant, unavoidable land use impact, the enhanced recreational opportunities are considered a beneficial effect of this alternative.

Impact

17.2.5-1 **The 6 CAC/D reservoir project would affect several privately owned parcels and require relocation of residences.**

There are seven residences that would be inundated or which would need to be removed for road relocations due to the reservoir. This would be considered a significant impact.

Mitigation Measure

17.2.5-1 *The MPWMD would provide compensation to property owners at market value. However, this impact would remain an unavoidable significant impact.*

Impact

17.2.5-2 **The 6 CAC/D reservoir project would result in absence of year-round stream flow and cause reduction of riparian vegetation.**

Analyses show that under the 6 CAC/D alternative, stream flow in the lower Carmel River and at the Carmel Lagoon would be similar to that described for the 9 NLP/D alternative and the No Project condition during both normal and critically dry years (see Figure 7-6 and 7-7, in Chapter 7). The 6 CAC/D alternative also results in some reduction of riparian vegetation. These impacts are considered significant.

Mitigation Measure

17.2.5-2 *The MPWMD would implement the Riparian Corridor Management Plan and Program. However, stream flow would still be inadequate to support instream recreational uses and decline of riparian vegetation would most likely continue.*

Implementation of the District's Riparian Corridor Management Plan and five year mitigation program would probably yield some improvement of lower river vegetation resources. However, these efforts would be localized and could not replicate beneficial effects of improved groundwater conditions which would result from permanent improvement of river flow and aquifer recharge. Therefore, because ongoing impairment of recreational benefits of the river would continue after mitigation, recreational impacts of this alternative would be significant and unavoidable.

17.2.6 11,000 AF SAN CLEMENTE CREEK RESERVOIR (11 SCC)

The 11 SCC project would create new passive recreational opportunities at the reservoir area, such as hiking, for public use and would enhance instream recreational activities downstream of the reservoir This is considered a beneficial impact. Property affected by the San Clemente Creek

Reservoir is privately owned, and includes a portion of a private recreational development. The new reservoir under this alternative would be publicly owned and open to the public for passive, daytime recreational use. Boating, swimming, fishing and camping at the reservoir would be prohibited, as would motorized vehicles.

Under the 11 SCC alternative (similar to the 24 NLP alternative) the Lagoon would experience flows during all but one month during normal years, therefore, instream recreational opportunities downstream of the existing San Clemente Dam would be substantially enhanced. Flows during critically dry years would be only marginally superior to the No Project condition (two additional months, or five months of the year). However, Lagoon conditions and thus, passive recreational opportunities, would be expected to improve, despite low flows, due to replenishment of the underlying aquifer.

Impact

17.2.6-1 **The 11 SCC project would affect developed privately owned land.**

The upper end of the reservoir would inundate a portion of a vacation ranch that consists of approximately six to ten vacation homes, a fish pond, and a recreation center. This would be considered a significant impact.

Mitigation Measure

17.2.6-1 *The MPWMD would provide compensation to property owners at market value. However, the loss of this vacation ranch would be considered an unavoidable significant impact.*

17.2.7 10,500 AF CHUPINES CREEK RESERVOIR (10 CHU)

The 10 CHU project would create new passive recreation use of the reservoir area, such as hiking, for public use, and would substantially enhance instream recreational opportunities downstream of the Chupines Reservoir. This is considered a beneficial impact. Property affected by the Chupines

Creek project is presently a privately owned cattle ranch. The Chupines Creek Reservoir would be publicly owned and open to the public for passive, daytime recreational use. Boating, swimming, fishing and camping at the reservoir would be prohibited, as would motorized vehicles.

Under the 10 CHU alternative (similar to the 24 NLP alternative) the Lagoon would experience year-round flows during normal years, therefore, instream recreational opportunities downstream of the existing San Clemente Dam would be substantially enhanced. Flows during critically dry years would be only marginally superior to the No Project condition (one additional months, or four months of the year). However, Lagoon conditions and thus, passive recreational opportunities, would be improved, despite low flows, due to replenishment of the underlying aquifer.

Impact

17.2.7-1 **The 10 CHU project would affect a privately owned agriculture preserve which is under the Williamson Act.**

The 173 acre reservoir would be entirely within a privately owned parcel which is under the Williamson Act. The Williamson Act allows prime agricultural lands to be valued for tax assessment according to their agricultural value rather than their true market value. According to the Williamson Act contract for this property, a "water facility" would be an allowable use. Therefore, the impact would be considered insignificant, but the loss of private residence would be significant.

Mitigation Measures

17.2.7-1(a) *The MPWMD would provide compensation to the property owner at market value; however, the loss of a private residence would be considered significant and unavoidable.*

17.2.7-1(b) *The MPWMD could apply to the County Board of Supervisors to release the property from the Williamson Act Contract.*

17.2.8 25,000 AF CAÑADA RESERVOIR (25 CAN)

The 25 CAN project would allow passive recreation use of the area, such as hiking, for public use. This is considered a beneficial impact. The land affected by the 25 CAN alternative is presently undeveloped private property, though subdivisions are planned for some parcels. The Canada Reservoir would be publicly owned and open to the public for passive, daytime recreational use

Boating, swimming, fishing and camping at the reservoir would be prohibited, as would motorized vehicles.

Impact

17.2.8-1 The 25 CAN reservoir would impact development proposed for the site.

A subdivision has been proposed for the reservoir site and surrounding area. Although the proposal has not been approved, planning for the development is underway. If approval of the subdivision was granted, development of the reservoir would cause a significant impact.

Mitigation Measure

17.2.8-1 *The county should coordinate planning for the subdivision with the project sponsor to prioritize development. This would reduce this impact to a less than significant level.*

Impact

17.2.8-2 The 25 CAN project would result in absence of year-round stream flow.

Analyses show that under the 25 CAN alternative, stream flow in the lower Carmel River and at the Carmel Lagoon would be similar to that described for the 9 NLP/D alternative and the No Project condition during both normal and critically dry years (see Figure 7-6 and 7-7, in Chapter 7). This impact is considered significant. However, while aquifer recharge under this alternative would improve the condition of riparian vegetation, recovery would be less than that provided with enhanced stream flow. Therefore, as a conservative assessment of potential future conditions, the 25 CAN alternative would have less than significant passive recreational impacts (rather than having beneficial effects).

Mitigation Measure

17.2.8-2 *The MPWMD would implement the Riparian Corridor Management Plan and Program. However, stream flow would still be inadequate to support instream recreational uses. This impact is therefore considered significant and unavoidable.*

Implementation of the District's Riparian Corridor Management Plan and five year mitigation program would yield some improvement of lower river vegetation resources. These improvement would supplement benefits derived from aquifer recharge effects of the 25 CAN alternative. These improvements would not increase stream flow in the lower river though, and continued impairment of instream recreational opportunities would remain significant after mitigation.

17.2.9 7 MGD DESALINATION PLANT (7 DSL)

This alternative would produce no improvement of upstream recreational benefits, as is the case under each of the other alternatives, to greater or lesser extent.

Impact

17.2.9-1 **The 7 DSL alternative would result in absence of year-round stream flow and cause reduction of riparian vegetation.**

Analyses show that under the 7 DSL alternative, stream flow in the lower Carmel River and at the Carmel Lagoon would be similar to that described for the 9 NLP/D alternative and the No Project condition during both normal and critically dry years (see Figure 7-6 and 7-7, in Chapter 7). The 7 DSL alternative also results in some reduction of riparian vegetation. These impacts are considered significant.

Mitigation Measure

17.2.9-1 *The MPWMD would implement the Riparian Corridor Management Plan and Program. However, stream flow would still be inadequate to support instream recreational uses and decline of riparian vegetation would most likely continue.*

Implementation of the District's Riparian Corridor Management Plan and five year mitigation program would probably yield some improvement of lower river vegetation resources. However, these efforts would be localized and could not replicate beneficial effects of improved groundwater conditions which would result from permanent improvement of river flow and aquifer recharge. Therefore, because ongoing impairment of recreational benefits of the river would continue after mitigation, recreational impacts of this alternative would be significant and unavoidable.

17.2.10 NO PROJECT ALTERNATIVE

The No Project alternative is not expected to have any direct land use impacts. However, depending on the location of the new wells in the Seaside Coastal groundwater subbasin, there could be some impacts to existing land uses where the wells are sited. This alternative would produce no improvement of recreational resources, as is the case under all but the 7 DSL alternative.

Impact

17.2.10-1 **The No Project alternative would result in the absence of year-round stream flow and cause a continuing loss of riparian vegetation.**

Analyses show that under the No Project alternative, stream flow in the lower Carmel River and at the Carmel Lagoon would be absent during for between five to nine months of the year (see Figure 7-6 and 7-7, in Chapter 7). The No Project alternative also results in continuing reduction of riparian vegetation. These impacts are considered significant.

Mitigation Measure

17.2.10-1 *The MPWMD would implement the Riparian Corridor Management Plan and Program. However, stream flow would still be inadequate to support instream recreational uses and decline of riparian vegetation would most likely continue.*

Implementation of the District's Riparian Corridor Management Plan and five year mitigation program would probably yield some improvement of lower river vegetation resources. However, these efforts would be localized and could not replicate beneficial effects of improved groundwater conditions which would result from permanent improvement of river flow and aquifer recharge. Therefore, because ongoing impairment of recreational benefits of the river would continue after mitigation, recreational impacts of this alternative would be significant and unavoidable.

18. SOCIOECONOMICS

18.1 INTRODUCTION

This chapter provides a socioeconomic profile of the area within the MPWMD boundaries as it is today and an analysis of the direct effects of a water supply project on the socioeconomic environment. Direct effects are defined as those effects attributable to a project itself rather than to the urban growth allowed by the project. Direct effects include changes in water rates and the increase in economic activity resulting from a large construction project. The indirect environmental effects of water supply alternatives that allow urban growth are discussed in Chapter 19.

18.2 SETTING

18.2.1 POPULATION

The boundaries of the Monterey Peninsula Water Management District (MPWMD) contain six incorporated cities: Monterey, Carmel, Del Rey Oaks, Pacific Grove, Sand City, and Seaside, as well as unincorporated areas of Monterey County. Table 18-1 shows the population growth in these areas during the 1970s and late 1980s.

As shown in the Table 18-1, the District's population increased by about 22 percent in the 18 years between 1970 and 1988. The unincorporated areas showed the highest percentage increase in growth (36 percent) with the City of Pacific Grove second at 21 percent. The two smallest communities experienced population declines during this period. More than 75 percent of the District's population lives in incorporated cities.

TABLE 18-1

POPULATION IN MPWMD SERVICE AREA: 1970-1988

Jurisdiction	1970[1]	1980[2]	1988	1970-1988 Percent Change
Incorporated Cities				
Carmel	4,525	4,707	4,978	10.0
Del Rey Oaks	1,823	1,557	1,520	-16.6
Monterey	26,302	27,558	31,397	19.4
Pacific Grove	13,505	15,755	16,367	21.2
Sand City	212	190	200	-5.7
Seaside	20,165	36,567[3]	24,072	19.4
Cal-Am	N/A	N/A	21,808	N/A
Non Cal-Am	N/A	N/A	2,264	N/A
Unincorporated Areas	19,222	27,000	26,289	36.8
Cal-Am	N/A	N/A	24,094	N/A
Non Cal-Am	N/A	N/A	2,195	N/A
TOTAL	85,754	113,334	104,823	22.2

[1] Monterey County Planning Department, Demographic Analysis of Monterey County, June, 1982.
[2] 1980 U.S. Census.
[3] 1990 population includes Fort Ord.

Source: EIP Associates

18.2.2 EMPLOYMENT

The strong employment sectors in Monterey County as a whole are the military, services, agriculture and retail trade.[1] In 1980, these four sectors constituted nearly 70 percent of total employment in the County. The MPWMD service area, however, includes relatively little of the County's agricultural employment, but most of the military employment and the service/retail trade related to the tourist industry. The tourist industry is anticipated to be a major growth sector in this part of the County. Three military operations are located within the District, including the Presidio of Monterey, the Naval Post Graduate School, and the local Coast Guard Facility. All three operations are located within the City of Monterey. Tourism is second only to the military in its impact on the Monterey Peninsula. Besides the direct effect on employment in hotels and restaurants, travel-related expenditures create jobs in the service and retail sectors that cater to visitors. A further discussion of the tourist industry and its impacts on employment levels within the District follows below in Section 19.10. The MPWMD service area had a total employment of 39,289 in 1980 (excluding Fort Ord), about 35 percent of the County total. By 1988, total employment had increased to 46,277 persons. The distribution of total employment among Peninsula jurisdictions appears in Table 18-2.

Monterey is clearly the dominant employment center in the region, based on the total number of jobs in each jurisdiction and a comparison of jobs to housing in each community (Table 18-3). Del Rey Oaks, Pacific Grove and Seaside are largely residential communities.

18.2.3 HOUSING

Single-family dwelling units predominate within the MPWMD service area as shown in Table 19-1. Single-family units compose approximately two-thirds of the total dwelling units in the service area. The cities of Carmel and Del Rey Oaks have the highest proportion of single-family dwellings (80 and 98 percent, respectively). Other jurisdictions within the service area have lower proportions of single family units, with Monterey having approximately 48 percent single family units.

18.2.4 WATER RATE STRUCTURE

Cal-Am Water Company is the primary water purveyor, with rates regulated by the California Public Utilities Commission (PUC). Because the District is not a water purveyor, it does not

TABLE 18-2

EMPLOYMENT IN MPWMD SERVICE AREA
1980-1988

Jurisdiction	1980[1]	1988[5]
Incorporated Cities		
Carmel	3,400[2]	3,555
Del Rey Oaks	415	498
Monterey	23,615	27,175
Pacific Grove	3,858	4,444
Sand City	1,214[3]	1,550
Seaside (Cal-Am)	3,616	3,960
Seaside (Non Cal-Am)	N/A	170
Unincorporated Areas		
Cal-Am	3,171[4]	4,824
Non Cal-Am	N/A	101
Total	39,289	46,277

[1] Recht Hausrath Associates, Socioeconomic Impacts of The Proposed San Clemente Dam, June, 1984.
[2] Carmel-by-the-Sea General Plan, February, 1984.
[3] Sand City Housing Element, June, 1985.
[4] EIP Associates.
[5] Ibid

Source: EIP Associates

TABLE 18-3

JOBS/HOUSING RATIOS[1]

Jurisdiction	1980	1988
Carmel	1.09	1.11
Del Rey Oaks	0.72	0.86
Monterey	1.80	2.07
Pacific Grove	0.51	0.55
Sand City	12.91	15.98
Seaside (Cal-Am)	0.47	0.55
Seaside (Non Cal-Am)	N/A	0.16
Monterey County (Cal-Am)	0 29	0.48
Monterey County (Non Cal-Am)	N/A	0.11

[1] Ratio is determined by dividing total number of employees by total number of dwelling units in each jurisdiction. Ratios above 1.0 indicate commercial emphasis, ratios below 1.0 indicate a residential emphasis.

Source. EIP Associates, based on the following data sources: 1980 U.S. Census Association of Monterey Bay Area Governments, Recht-Hausrath Associates

charge for water delivery. The MPWMD does, however, levy water connection fees and an 8.125 percent water use fee on the Cal-Am bill for its conservation program as well as Carmel River environmental and erosion control projects. Water connection fees and service charges vary by type of use. Annual studies of water use in the District provide the basis for the connection fee structure. Residential structures are charged for the number of plumbing fixture units in the dwelling unit. In 1990, the charge is about $68 for each of the first ten fixture units, and $135 for each additional fixture unit, the average connection charge for a home is about $3,000.[2] Charges for non-residential connections are based on the specific user category (e.g., restaurant, fast food, office, hotel) represented. The charge is based on a figure of $13,529 per acre-foot (1990 rate), multiplied by the projected average annual water use in each user category.[3]

Service charges for monthly water use are made by Cal-Am and the other water suppliers in the District. Cal-Am presently charges about $52 every two months for the average residential customer, or about $26 per month.[4]

18.3 IMPACT OF PROJECT IMPLEMENTATION

18.3.1 RESIDENTIAL WATER RATES IN THE YEAR 2002

Cal-Am water service connections are projected to increase from the present 36,000 connections to about 42,200 connections by the year 2002, the assumed first year of project operation. Of the 42,200 total connections, about 34,900 are estimated to be residential connections.

Table 18-4 summarizes the average monthly increase in Cal-Am rates per residential customer due to project expenses, mitigation measures and Cal-Am system improvements that would be required with each alternative. (See Chapter 4, Section 4.13 for information on capital and annual costs). The costs presented in Table 18-4 would be in addition to the base Cal-Am monthly rate in the year 2002. The year 2002 base amount will be substantially higher than the 1991 base of $26 per month due both to inflation between now and the year 2002, and because new Cal-Am facilities will be required to meet recent amendments to federal water quality standards.

As shown in Table 18-4, the total average cost increase per residential Cal-Am customer would range from about four dollars per month for the No Project to about $30 per month for the 25,000 AF Canada Reservoir alternative. The remaining alternatives would increase costs by about $13

TABLE 18-4

ESTIMATED INCREASE IN CAL-AM RESIDENTIAL RATES IN YEAR 2002
(Costs in $/Month/Residential Customer)[1]

Alternative	Project	Mitigation[2]	Cal-Am System Improvements[3]	Total
24 NLP	$ 7.40	$ 2.64	$ 3.68	$ 13.72
16 NLP/D	14.37	2.01	3.11	19.49
9 NLP/D	13.44	3.08	3.11	19.63
23 NSC	5.98	3.73	3.45	13.29
6 CAC/D	11.55	2.99	3.35	17.59
11 SCC	7.46	2.41	3.91	13.51
10 CHU	8.50	2.20	3.92	14.33
25 CAN	18.76	1.59	9.76	29.87
7 DSL	18.20	1.21	2.51	21.88
NO PRJ	0.00	1.23	2.95	4.18

[1] Average residential costs based on a projection of 34,900 Cal-Am residential customers by the year 2002. Cost estimates assume $3,000,000 payment from Capital Facilities Fund, and Annual Capital Costs allocated as follows. 50% new connections, 25% Cal-Am Residential, and 25% Cal-Am Other categories. OM&R costs allocated as follows. 50% Cal-Am Residential customers and 50% Cal-Am Other categories of customers (Commercial, Public and Golf Course).

[2] Mitigation costs include riparian vegetation, fisheries and off-site road improvements

[3] Costs include improvements to Cal Am system water treatment plant, pipelines, booster stations, tanks and new wells needed with each alternative to meet future demand. Costs for Cal-Am improvements do not include additional facilities needed to meet recent amendments to federal water quality regulations.

Source: MPWMD

per month for the 23,000 AF New San Clemente Reservoir to about $22 per month for the 7 MGD desalination alternative. It should be noted that these rates are averages, the actual bill increase experienced by each residential customer would likely be different from the costs presented here. Cal-Am bill increases were not calculated for the commercial sector.

18 3.2 CONSTRUCTION EMPLOYMENT

Construction of any of the proposed alternatives would result in a temporary increase in employment. The estimated number of person years of employment that would result from each of the alternatives is presented in Table 18-5, the alternatives range from 42 person-years of employment for the No Project alternative to 1,389 person-years of employment for the 25,000 AF Cañada Dam alternative. Because this temporary construction employment would have no direct environmental effects, no mitigation measures are required.

TABLE 18-5

CONSTRUCTION EMPLOYMENT[1]

Alternative	Person-Years Employment[2]
24 NLP	530
16 NLP/D	630
9 NLP/D	566
23 NSC	451
6 CAC/D	513
11 SCC	534
10 CHU	574
25 CAN	1,389
7 DSL	554
NO PRJ	42

[1] Assumes that labor represents 30 percent of the construction cost estimate.
[2] Construction employment estimates are presented in terms of person-years to provide an equivalent basis of comparison due to the differing lengths of construction for the various alternatives.

Source: EIP Associates.

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1. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Washington D.C., 1983.

2. Henrietta Stern, Monterey Peninsula Water Management District, telephone communication, December 4, 1990.

3. Ibid.

4. Louis Banca, Cal-Am Water Company, telephone communication, July 17, 1991. Residential average was calculated using 1991 rates applied to 1987 normal year demand (19 units per two-month billing period, gravity zone, 5/8" meter). Actual use in 1990 was 30 percent less (twelve units) due to rationing.

19. GROWTH AND ITS EFFECTS ON THE MONTEREY PENINSULA

19.1 INTRODUCTION AND SUMMARY

The California Environmental Quality Act requires an EIR to "discuss the growth inducing impacts of the project" (Section 21100(g)). The Council on Environmental Quality regulations implementing NEPA contain a similar requirement (Section 1508.8). The State CEQA Guidelines elaborate on this requirement:

> Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas) [Population increases] may further tax ... community service[s] ... [or] encourage ... other activities that could significantly affect the environment ... It must not be assumed that growth in any area is necessarily beneficial, detrimental or of little significance to the environment. (Section 15126(g))

The following discussion addresses these requirements. Three issues are of concern. First, do the water supply system improvement alternatives under consideration "foster economic or population growth" directly or indirectly, are they growth inducing? If so, is the level of growth significant? Finally, if significant, are the effects also adverse with respect to environmental and/or human health and welfare?

If none of the long-term water supply alternatives are built, growth that is now planned for the Peninsula would be constrained by lack of municipal water supply. Planned growth in much of the District has already been constrained by a reduced water allocation set by the District Board in December 1990, as well as by the temporary moratorium imposed by the District pending development of new supplies. Based on this evidence, it is clear that expansion of the water supply system would remove one obstacle to District growth, by statutory and judicial definition of the term, long-term water supply expansion alternatives would all be "growth inducing".

The amount of growth which could be supported by the proposed system expansion would be significant. a 43 percent increase in population, a 34 percent residential increase and a 75 percent increase in employment above 1988 levels. This represents "build out" of the District's service area as allowed under applicable general plan and zoning intensities; this level of development is considered by the District as the appropriate target for system capacity planning purposes.

Direct and indirect effects of this amount of population increase are, in most instances, anticipated and planned for by local, regional and State jurisdictions responsible for maintenance and improvement of existing environmental and quality of life conditions on the Peninsula. Thus, while adverse environmental impacts would be expected to result from anticipated population increase supported by, or induced by the project, in most instances, existing regulatory/planning programs may be presumed sufficient to mitigate these impacts. Areas of particular concern are maintenance of regional transportation system service levels and deterioration of regional air quality.

Finally, water supply is only one of many critical factors which regulate growth. While the present, restricted availability of water clearly constrains growth within the District, implementation of the proposed system supply improvements would not solely assure attainment of growth levels planned for by Peninsula jurisdictions.

19.2 POPULATION, EMPLOYMENT AND HOUSING ESTIMATES

The MPWMD has determined that the appropriate water supply goal should be to meet the needs of ultimate, or buildout housing and employment levels, and associated population increases, as set forth in general plans and zoning of communities within the District, rather than provision of specific year demand estimates. The ideal forum to discuss the impacts of this policy on District population growth and on the quality of life in the Monterey Peninsula would be a comprehensive land use plan for the District service area. Unfortunately, no such document exists. The Association of Monterey Bay Area Governments (AMBAG), the County of Monterey and the cities in the area all have addressed the topic of growth impacts in various documents. However, there is no land use planning agency whose jurisdiction coincides with the boundaries of the Monterey Peninsula Water Management District's service area, and therefore no agency with the authority

to develop Peninsula-wide policies relating to growth. As a result, the District's first step in planning an expanded water supply was to enlist the help of local agency planners to develop population, employment and housing growth projections, at buildout, for each jurisdiction on the Peninsula. These projections are contained in a July 1988 study conducted by EIP Associates.[1]

Buildout refers to estimates of the employment and housing that could legally exist within the MPWMD boundaries under applicable General Plans, zoning, and applicable land use policies as of January 1988, if (1) all current General Plans, zoning, and applicable land use policies remain unchanged, (2) water and sewage treatment capacity availability is not a development constraint, (3) all property owners wished to develop their property to the maximum permissible under current plans and zoning, and (4) the cities and the County permitted every property to be developed in the most intensive manner permissible under current plans and zoning. EIP's report presents an estimate of maximum buildout potential under current policies -- it is NOT a forecast of the most likely level of ultimate development. The buildout estimates are shown in Tables 19-1 and 19-2. Because some jurisdictions are considering General Plan amendments in 1991 and early 1992, the Final EIR/EIS will provide refinements to the growth estimates.

EIP's analysis indicates that, at buildout, residential growth could increase by about 35 percent within the District (16,117 new dwelling units with 75 percent of the residences being multi-family units). The single-family unit increases could be especially modest in the cities. Monterey could actually experience a 5 percent loss in single-family units, while Carmel could show the largest gain at 14 percent. The increase in multi-family units in the cities could be substantial. The increases could range from 24 percent in Seaside to 96 percent in Pacific Grove. The largest absolute increase could occur in Monterey with the addition of 5,089 multi-family units.

The 34,721 new jobs estimated within the District boundaries could represent a 75 percent increase in employment levels. The employment increase could range from 30 percent in Pacific Grove to 283 percent in Sand City. Monterey could experience the largest increase in absolute terms, with 12,173 new jobs. In addition, the Monterey Research Park could provide another 8,404 new jobs at buildout.

TABLE 19-1

DISTRICT-WIDE SUMMARY OF HOUSING & POPULATION

	Existing (Jan 1. 1988)[1]	Additional Potential	Buildout Total
Residential Units			
Single-Family Units			
Carmel-by-the-Sea	2,593	379	2,972
Del Rey Oaks	573	3	576
City of Monterey[2]	6,381	(313)	6,068
Pacific Grove	5,244	232	5,476
Sand City	74	0	74
Seaside (Cal-Am)[3]	4,901	295	5,196
Seaside (Non Cal-Am)[3]	620	0	620
County of Monterey (Cal-Am)	8,190	2,717	10,907
County of Monterey (Non Cal-Am)	868	887	1,755
Subtotal Single-Family	29,444	4,200	33,644
Multi-Family Units			
Carmel-by-the-Sea	619	506	1,125
Del Rey Oaks	9	151	160
City of Monterey[2]	6,721	5,089	11,810
Pacific Grove	2,769	2,661	5,430
Sand City	23	2,617	2,640
Seaside (Cal-Am)[3]	2,516	614	3,130
Seaside (Non Cal-Am)[3]	150	0	150
County of Monterey (Cal-Am)	1,955	279	2,234
County of Monterey (Non Cal-Am)	56	0	56
Subtotal Multi-Family	14,818	11,917	26,735
Total Dwelling Units	44,262	16,117	60,379
Population			
Carmel-by-the-Sea	4,978	1,589	6,567
Del Rey Oaks	1,520	402	1,923
City of Monterey[4]	31,397	10,922	42,319
Pacific Grove	16,367	5,909	22,276
Sand City	200	5,395	5,595
Seaside (Cal-Am)	21,808	2,673	24,481
Seaside (Non Cal-Am)[3]	2,264	0	2,264
County of Monterey (Cal-Am)	24,094	7,116	31,210
County of Monterey (Non Cal-Am)	2,195	2,107	4,301
Total Population at Buildout	104,823	36,112	140,937

[1] Population figures for January 1, 1988 differ slightly from those estimated by the California Department of Finance (DOF) because the dwelling unit counts used in this report differ slightly from those used by DOF.
[2] Excludes 2,520 existing and 396 future beds in military barracks.
[3] Excludes military housing at Fort Ord.
[4] Includes military population associated with 2,520 existing and 396 future beds in barracks.

Source: EIP Associates

TABLE 19-2

DISTRICT-WIDE SUMMARY OF EMPLOYMENT

	Existing (Jan 1, 1988)	Additional Potential	Buildout Total
Carmel-by-the-Sea	3,555	1,409	4,964
Del Rey Oaks	498	266	764
City of Monterey (excluding Monterey Research Park)	27,175	12,173	39,348
Monterey Research Park	0	8,404	8,404
Pacific Grove	4,444	1,323	5,767
Sand City	1,550	4,390	5,940
Seaside (Cal-Am)	3,960	4,320	8,280
Seaside (Non Cal-Am)	170	30	200
County of Monterey (Cal-Am)	4,824	1,935	6,759
County of Monterey (Non Cal-Am)	101	471	572
Total Employment	46,277	34,721	80,998

Source: EIP Associates

19.3 PROJECT RELATIONSHIP TO OTHER FACTORS THAT REGULATE GROWTH

Except for the No Project alternative, all of the alternatives analyzed in this EIR/EIS are sized to meet the Peninsula's projected municipal water demand at buildout, defined as normal year Cal-Am production of 23,080 AF. By definition, all feasible project alternatives would "induce" growth because they would allow presently planned growth to occur without being constrained by a lack of water supply.

However, while important, water supply is only one of many factors which must successfully interact to foster growth in any particular area; wastewater treatment, roads, schools and public safety services - a pleasant climate; these factors all affect a region's growth rate. The two most important factors though, which cause (or restrain) growth, are market forces and community governments.

Without market demand, growth will not occur despite the existence of plentiful water supplies or other urban services. Without supportive local government policies, market demand cannot be realized, again despite the presence of water or other services. Market forces are difficult to predict; their analysis does not provide a sound basis for utility planning. Local government policies, on the other hand, are relatively more stable, and represent a more predictable upper limit of eventual population and service demand increase.

County and local governments influence growth by allowing or preventing construction in particular areas, or in an entire community, by means of general plan land use policies and zoning ordinances. Growth policies often indicate the buildout population that a community's land area and infrastructure can comfortably support. After public review, the plans and policies are adopted by elected officials, presumably, these officials reflect the will of the community. These same elected officials approve and veto specific development proposals. Mandatory environmental evaluation of both a community's plans and specific development proposals must discuss the growth-inducing effects of their implementation, citizens and interest groups and other government agencies have the opportunity to comment during the preparation and adoption of these plans and during the public hearings. Through these processes, communities decide where and how much growth is to occur.

Once plans are adopted by a community, the District perceives a responsibility to respond to the community's desires as expressed in the general plan; the District's water demand estimates are based on population and employment projections that are consistent with present land use plans. It uses these demand estimates to plan for its staffing and facilities. This is true of other service agencies (e.g., wastewater treatment agencies, school districts, police and fire protection departments, etc.); they must also must consider the expressed development plans of the communities that they serve.

The District must also be responsive to objectives and requirements of pertinent regional bodies. To facilitate orderly and environmentally benign development, the District would allocate expanded water supplies in five-year increments at a rate consistent with population projections contained in the 1989 Air Quality Management Plan (or subsequent Plans). The District may also be called upon to phase the water allocation to coordinate with the Traffic Congestion Management Plan now being developed by the Monterey County Transportation Commission. The allocation limit and the phasing of the allocation will be part of the project voted on by the public and, once approved, could be increased only by another public vote.

The next stage of this analysis involves applying the District's growth estimates to environmental and social factors in order to estimate potential worst case impacts on quality-of-life indicators such as traffic, air quality, wastewater and solid waste removal, schools and the fiscal health of local jurisdictions. It should be noted, because of the District's relatively inferior role in the democratic formulation of community development objectives, that the effects of potential growth described in this chapter cannot be directly and solely attributed to the water supply system improvements. Growth, to the extent that it will occur in the Peninsula, will largely result from the interaction of market forces and local land use planning policies, and will be equally hindered, or helped along, by the actions of other infrastructure-providing agencies (e.g., roads, schools, etc.).

19.4 TRAFFIC

This section of the EIR/EIS analyzes the traffic implications of estimated growth on major regional transportation corridors on the Monterey Peninsula for buildout. The existing regional roadway network in the Monterey Peninsula area consists of State Route 1 (SR 1), State Route 68 (SR 68), and State Route 218 (SR 218) serving the urban areas of Monterey County.

- State Route 1. The SR 1 alignment parallels the coast, generally extending northeast to southwest through the Monterey Peninsula region. It is mainly a four-lane freeway providing regional access to all of the major jurisdictions in the area.

- State Route 68. Two separate alignments of SR 68 serve the project area. SR 68 from SR1 north to Monterey and Pacific Grove (Holman Highway) is a two-lane highway that provides the major access to the Monterey Peninsula. SR 68 from SR 1 south along the Monterey Salinas Highway is generally a two-lane highway that provides the major linkage between Monterey and Salinas.

- State Route 218. SR 218 is an approximately 2.5- to 3-mile long two-lane highway that links SR 68 (Monterey Salinas Highway) to the south with SR 1 to the north. SR 218 provides access mainly to Del Rey Oaks, Seaside, and Monterey.

The analysis indicates that significant improvements to the transportation system are necessary to accommodate future growth. (Section 19.8, Fiscal Impacts, briefly describes financing for the road improvements.)

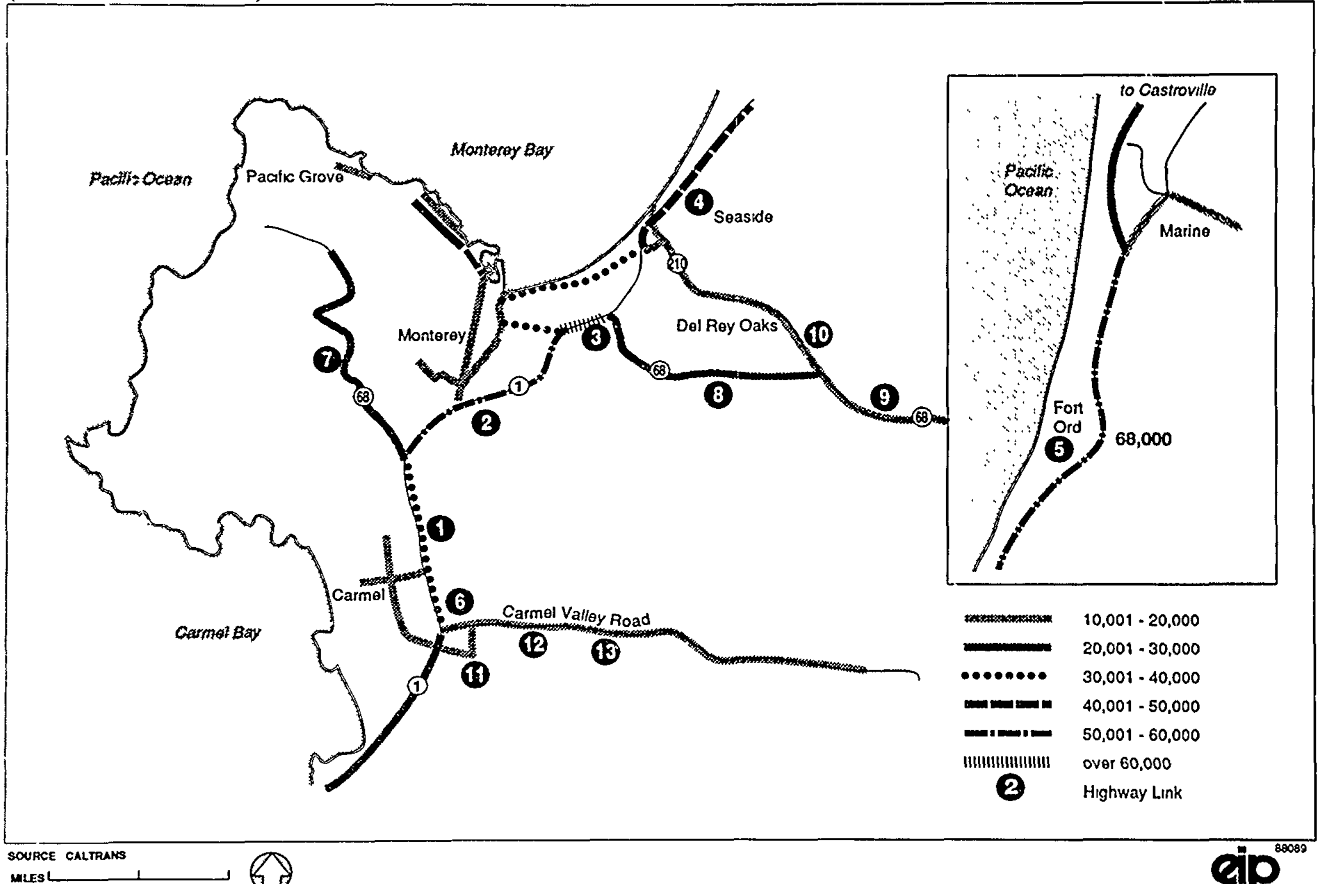
19.4.1 METHODOLOGY

The analysis uses 1986 freeway and major roadway traffic counts (Figure 19-1) as provided by Caltrans and the Monterey County Public Works Department, to establish existing levels of service on major highways of the Peninsula (Figure 19-2).[2,3] Level of Service definitions are listed in Table 19-3. Traffic volumes were estimated by conducting travel demand forecasts for buildout. Travel demand forecasts were made in three steps: quantifying trip generation based on type of land development (including background growth in trips), calculating mode splits (e.g., figuring the percentage of people traveling by private car or transit), and assigning routes traveled. This analysis incorporated the conservative assumption that all trips are made by private auto; route assignments assumed that drivers would take routes that minimize travel distances and continuation existing traffic patterns (except that increased commuting from Salinas and Marina was explicitly taken into account due to the changing jobs/housing balance in the land use estimates). The background growth in trips is in addition to the trips calculated directly from the housing and employment growth projections, and is attributable to tourist/visitor trips among other factors.

After calculating future volumes, the analysis generates predicted highway levels of service (LOS) by incorporating proposed highway improvements. The list of improvements below was taken from the Regional Transportation Plan,[4] although some are also mentioned in draft Route Concept

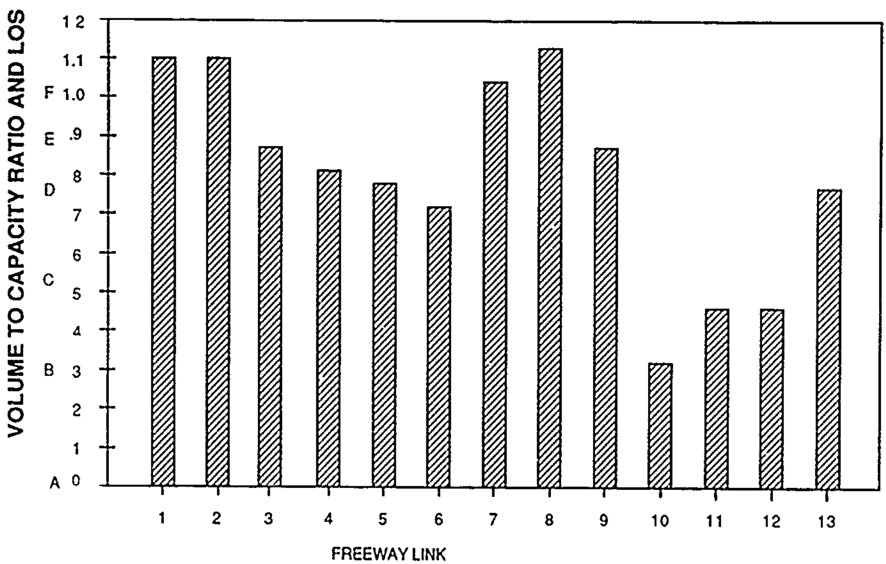
1989 MONTEREY PENNINSULA AVERAGE DAILY TRAFFIC
(VEHICLES PER DAY)

FIGURE 19-1



eip 88089

HIGHWAY LEVEL OF SERVICE (LOS)
YEAR 1989



LINK	DESCRIPTION
1	SR 1 from Carmel Valley Road to Carmel Hill
2	SR 1 from Carmel Hill to Sloat undercrossing
3	SR 1 from Sloat undercrossing to SR 68 (N)
4	SR 1 from SR 68 (N) to Ord Village
5	SR 1 from Ord Village to South Marina
6	Carmel Valley Road from SR 1 to Carmel Rancho Boulevard
7	SR 68 - Holman Highway
8	SR 68 from east junction SR 1 to SR 218
9	SR 68 from SR 218 to Los Laureles Grade
10	SR 218 north of SR 68
11	SR 1 from Carmel River to Carmel Valley Road
12	Carmel Valley Road from Carmel Rancho Bvd. to Via Petra
13	Carmel Valley Road from Via Petra to Valley Greens

LEGEND

Existing Traffic

SOURCE EIP ASSOCIATES

68089

TABLE 19-3

LEVEL OF SERVICE DEFINITIONS[1]

Level of Service	Freeway
A	Free flow vehicles unaffected by other vehicles in the traffic stream. V/C = 0.00/0.35
B	Higher speed range of stable flow. V/C = 0.36 to 0.54.
C	Stable flow with volumes not exceeding 78 percent capacity. V/C = 0.55 to 0.77.
D	Upper end of stable flow conditions. Volumes do not exceed 95 percent of capacity. V/C = 0.78 to 0.93.
E	Unstable flow at roadway capacity. Operating speeds 30 to 25 mph or less. V/C = 0.94 to 1.00.
F	Stop-and-go traffic with operating speeds less than 30 mph. V/C = > 1.00.

[1] V/C = Volume-to-capacity ratio.

Source: Highway Research Board, National Academy of Sciences - National Research Council, Highway Capacity Manual, 1965.

Reports prepared by Caltrans. The improvements assumed include:

- Hatton Canyon Freeway construction;
- Carmel Valley Road widening from State Route 1 to Carmel Rancho Boulevard and from Via Petra to Valley Greens Road;
- Holman Highway widening;
- State Route 68 widening from its eastern junction with State Route 1 to Los Laureles Grade, and;
- State Route 1 widening from Route 68 to Ord Village.

There is some doubt about implementation of several of the proposed road improvements. The Hatton Canyon Freeway is funded and a Final EIR is proceeding through the approval process, but a lawsuit filed by a group of local citizens threatens to delay the start of construction. Assuming a quick resolution of the litigation, the project could be completed by 1995.

The Holman Highway widening is the number two priority of the Monterey County Transportation Commission (MCTC) in Monterey County. A task force composed of public and private sector groups is meeting in an attempt to expedite the approval process. The project follows a Federal Aid Urban (FAU) route, thus priority for funding is set by local agencies. The FAU designation could limit the amount of funding available due to federal budget constraints. The project is expected to be completed in 2010 with a construction cost of $15 million.

The State Route 68 widening from State Route 1 to Los Laurles Grade is not a high priority project. The route could be upgraded to a four-lane expressway by 2030 at a cost of $60 million; and further improvements to a four-lane freeway could be completed by 2050 at a cost of $100 million.

The widening of State Route 1 from State Route 68 to Ord Village is a low priority for Caltrans, thus, given this designation the project would not be completed before 2040 at a cost of $10 million.

A more complete discussion of cost estimates and funding sources is presented below in Section 19.8.3.

19.4.2 EXISTING TRAFFIC

Several highway segments on the Peninsula are currently crowded in the peak hour to the point that they are classified as having poor levels of service (Figure 19-2). "Poor" LOS is defined by Monterey County as worse than LOS C in the peak hour. "Poor" LOS is defined in the Highway Capacity Manual as worse than LOS D in the peak hour.[5] The Congestion Management Plan (CMP), now being developed by MCTC, may specify LOS E as acceptable due to the fiscal obligations which could result should the CMP specify maintenance of higher service levels. This analysis uses the County's definition (LOS less than C) for identifying road links with poor LOS. Road links with poor LOS are as follows:

Route	Location	1986 LOS
SR 1	Carmel River to Carmel Valley Road	C/D
SR 1	Carmel Valley Road to Carmel Hill	F
SR 1	Carmel Hill to Sloat Undercrossing	F
SR 1	Sloat Undercrossing to SR 68	D
SR 1	SR 68 to Ord Village	D
SR 1	Ord Village to South Marina	C/D
CV Rd	SR 1 to Carmel Rancho Boulevard	E
SR 68	Holman Highway: Stuart to W. Jct. SR 1	E/F
SR 68	E. Jct. SR 1 to SR 218	F
SR 68	SR 218 to Los Laureles Grade	D

A number of streets in Peninsula cities have poor levels of service. These streets have not been analyzed specifically for this study, but it is important to recognize that as traffic increases in the region, conditions on these routes will degrade further. Del Monte Avenue in Seaside is operating above capacity, particularly between Highway 218 and Broadway. Traffic projections for the next ten years indicate that the volumes on the segment north of Broadway will soon exceed the capacity of the road. This northern segment must be widened to six lanes at substantial cost.[6]

Fremont Street in Seaside also experiences congestion during peak hours. In 1979, the County recommended removing parking on this street as a means of gaining adequate street capacity. This has not yet been implemented.

Carmel Valley Road, between Rancho San Carlos Road and Ford Road is currently operating at LOS D. An EIR prepared on the Carmel Valley Master Plan recommends that this segment be widened to include either four lanes or a center left-turn lane with other alignment improvements.[7] With this increase in capacity, the road segment would be able to accommodate projected traffic growth in this area.

Other major roadway links on the Peninsula maintain acceptable levels of service, as follows:

Route	Location	1986 LOS
Carmel Valley Road	Carmel Rancho Boulevard to Via Petra	B
Carmel Valley Road	Via Petra to Valley Greens	B
SR 218	North of SR 68	A/B

19.4.3 BUILDOUT CONDITIONS

Potential effects of Fort Ord's closure are not reflected in the following analysis of buildout conditions. No systematic evaluation of such effects has been conducted by appropriate agencies, and conclusions regarding the effects would be speculative at this point. Clearly though, closure of the Fort would certainly not increase area highway travel in the near term. Extensive site remediation activity, endangered species and coastal habitat preservation considerations, and absence of any broad consensus regarding appropriate future use of the Fort property, indicate that trip contributions from Fort Ord to the regional highway system will be below levels previously predicted, perhaps through 2010. Thereafter, trips associated with alternative development of the property for civilian commercial, residential and/or institutional use may or may not exceed existing contributions. Given the conservative assumptions of the buildout (i.e., 100 percent of trips via motor vehicle) and its incorporation of not insignificant existing and future trips generated by Fort activities, the analysis remains valuable as an indication of potential future buildout traffic conditions on the Peninsula.

Further development on the Peninsula would lead to higher traffic volumes on major highways. Ongoing highway widenings and other modifications are assumed, however, to lead to improved LOS at several links in the system at buildout despite heavier traffic volumes. Links that would benefit from the proposed highway construction projects include the following:

Route	Location	LOS Existing	LOS Buildout With Improvements	LOS Buildout Without Improvements
SR 1	Carmel Valley Road to Carmel Hill	F	C	F
CV Rd	SR 1 to Carmel Rancho Boulevard	E	C/D	F
SR 68	E. Junction SR 1 to SR 218	F	E	F
SR 1	Carmel River to Carmel Valley Road	C/D	C	F

Highway segments expected to undergo deteriorating LOS are as follows:

Route	Location	LOS Existing	LOS Buildout
SR 1	Sloat Undercrossing to SR 68	D	F
SR 1	Ord Village to South Marina	C/D	E/F
CV Rd	Carmel Rancho Boulevard to Via Petra	B	D
CV Rd	Via Petra to Valley Greens	B	C
SR 68	Holman Highway; Stuart to W. Jct. SR 1	E/F	F
SR 68	SR 218 to Los Laureles	D	E
SR 218	North of SR 68	A/B	D/E

In addition to the increased traffic on highways within the District due to growth in the residential sector, the growth in the commercial sector will increase the traffic volume as a result of in-commuting. The commercial sector will grow twice as much as the residential sector in cities within the District through buildout as discussed in Section 17.2.1. This relatively rapid growth in the commercial sector will increase commuting on roads within the District. Private vehicle travel accounts for 81% of the total trips on roads within the District, many of them commuters to Monterey, Salinas and Fort Ord, the communities that attract the largest proportion of home to work trips. These trips will increase through buildout, especially on SR 68 to and from Salinas, and SR 1 from Marina and Seaside.

Several improvements not currently planned would improve LOS on the following links.

Route	Location	LOS Existing	LOS Buildout
SR 1	Carmel Hill to Sloat UC - add 2 lanes; total 6	F	D
SR 68	Holman Highway - upgrade from 2-lane highway to 4-lane freeway	E/F	C
SR 68	E. Jct. SR 1 to SR 218 - add 4 lanes; total 6	F	C

The likelihood of these improvements being implemented is jeopardized by the funding constraints discussed in Section 19.8.3 According to current County policy, several of the links discussed would still have unacceptable LOS during the peak hour, even with construction of additional highway improvements. Portions of State Route 1 (from Carmel Hill to the south junction with State Route 68 and from Ord Village to South Marina) would experience LOS D during the peak hours. Additional highway modifications to improve traffic flow at these locations are possible if the decision-makers find that expected levels of service are unacceptable. Given the borderline "D" LOS assigned to several of these locations, however, it is unlikely that the expense of highway widenings would be justified for the small gain in expedited traffic flow.

In conclusion, growth levels which could be supported by proposed water system improvement, if realized, would contribute to reduction of LOS throughout the Peninsula, from relatively acceptable levels of A, B, C and C/D, to levels of E and F along many crucial road links. Feasible road system and intersection improvement could mostly alleviate these conditions but commitment of funding from federal, State, regional and local sources is not now apparent. The ability to enhance existing highway system capacity should not be considered adequate evidence to find that indirect traffic effects of growth supported by the proposed project would be mitigated to less than significant levels, more direct mitigation should be considered, such as linking the water allocation to local governments upon continued demonstration of fiscal commitments adequate to achieve service levels adopted in the Congestion Management Plan and/or in State mandated transportation and circulation elements of individual community general plans.

19.5 AIR QUALITY

Impacts of the Peninsula's growth on air quality were analyzed for future development in the region through buildout. Using information on existing and future traffic conditions on major Peninsula roadways, together with vehicular emission rates characteristic of California, emission totals for vehicles using these roadways were estimated. These totals are shown in Table 19-4.

Estimates of housing and commercial growth on the Peninsula are consistent with growth assumptions used in the development of the 1989 Air Quality Management Plan (AQMP) adopted by the Monterey Bay Unified Air Pollution Control District (MBUAPCD). The AQMP constitutes the State Implementation Plan applicable to the District's territory. The goal of the State's air

TABLE 19-4

PROJECTED AIR POLLUTANT EMISSIONS ON MAJOR ROADS IN THE MONTEREY AREA
(Tons/Day)

Pollutant	1986	Buildout
Total Organics	3.40	4.37
Reactive Organics	2.90	3.74
Nitrogen Oxides	1.72	1.51
Carbon Monoxide	35.51	36.20
Sulfur Dioxide	0.12	0.21
Particulates	0.26	0.41

Source: EIP Associates.

quality regulatory programs is to accommodate locally planned residential and commercial development while simultaneously planning for achievement and maintenance of specified levels of air quality.

Chapter 14 of the AQMP specifies that projects likely to increase population shall be considered consistent with the AQMP with respect to direct and indirect air quality effects, when the population increases resulting from their implementation are consistent with AQMP population projections. Although growth estimated by the MPWMD for individual Peninsula cities is higher than that projected within the AQMP, growth estimates for County areas and the Peninsula as a whole are somewhat lower than the projections. Growth as planned would therefore be consistent with planning projections of the AQMP for attainment of federal and State air quality standards within the region (at least through 2005, the 1989 AQMP planning horizon).

The State CEQA Guidelines provide that when a project demonstrates compliance with applicable air quality standards, the Lead Agency may presume that air quality impacts of the project would be less than significant (Section 15064(i)). At a program level, this criteria would appear to be met by the project. At the same time, CEQA specifies that information indicating that compliance alone would be insufficient to render air quality effects insignificant shall be considered by a Lead Agency before making it findings.

Therefore, it should be noted that, under emission control regulations in effect through 1991, reactive organic compound (ROG) emissions at buildout (i.e., after 2005) are projected to be higher than they are at present. Nitrogen oxide (NO_x) emissions are projected to exceed 1987 levels sometime after 1995. ROGs and NO_x contribute to the formation of photochemical oxidant, or smog, in the atmosphere (measured as ozone). High concentrations of oxidant impair breathing and cause eye irritation. As Table 19-5 shows, Peninsula traffic would account for 0.84 tons/day of ROG of the basin's increase at buildout, this increment amounts to an increase of 28.9 percent over the Peninsula's 1986 emissions levels. Motor vehicle emission of ROG and NO_x account for 36 percent and 50 percent of total emissions of these pollutants, respectively.

The air basin in which the Monterey Peninsula is located currently violates federal standards, and stricter State standards, for oxidant. The 1988 California Clean Air Act mandates revisions of the AQMP by December 1991. The revisions are to demonstrate compliance with applicable State (and federal) air quality standards by 1994, or, failing attainment, evidence of 5 percent annual emission reductions of oxidant and oxidant precursors (ROG and NO_x) until the standard is achieved. Therefore, while AQMP revisions may be adopted, they may prove inadequate to actually achieve the strict State standard for oxidant. Continued basin-wide growth may therefore be in compliance with the AQMP, but still contribute to increases in mobile- and stationary-source emissions of ROG and NO_x in the area as a whole. As a result, occasional high oxidant levels could continue to plague the air basin into the next century, especially after 2005, as a result of ROG and NO_x emissions associated with increased vehicle travel and other indirect manifestations of population growth accommodated by the project.

In contrast to the broadly distributed high oxidant levels produced by regionwide emissions of ROG and NO_x, problems associated with pollutants like carbon monoxide (CO) and particulates are generally confined to the vicinity of strong local sources, primarily heavily-traveled, congested road-

TABLE 19-5

AIR POLLUTION EMISSIONS INVENTORY
MONTEREY COUNTY AND MONTEREY PENINSULA[1,2]
(Tons/Day)

Mobile Source Pollutant	1986 Emissions	Estimated Buildout Emissions	% Change 1986-Buildout
Total Organics			
Monterey County	20.80	N/A	N/A
Peninsula	3.40	4.37	28.5
Reactive Organics			
Monterey County	19.40	N/A	N/A
Peninsula	2.90	3.74	28.9
Nitrogen Oxides			
Monterey County	23.10	N/A	N/A
Peninsula	1.72	1.51	-12.2

[1] Pollutant emissions for the Peninsula calculated from freeway traffic only.
[2] Assumes constant vehicle emission rate for 1986 and buildout.

Sources: Monterey Bay Unified Air Pollution Control District, California Air Resources Board.

ways. Because of the large increases in traffic expected on local roadways as a result of growth permitted by any of the feasible water supply projects and other cumulative regional growth, CO and particulate air quality standards may be exceeded near these roadways. The Carmel Valley in particular has been an area of concern regarding CO levels. The geography of the valley and its relationship to prevailing air currents makes it especially prone to the buildup of pollutants. The air quality analysis in the Carmel Valley Master Plan EIR (May 1985) suggests that future traffic volume alone will probably not be sufficient to create CO violations, but the added effect of wood burning stoves in new homes may create unhealthful levels of CO, among other pollutants. Elevated concentrations of CO impair oxygen transport in the bloodstream, aggravate cardiovascular disease, impair central nervous system functioning and cause fatigue, headache, dizziness and confusion.

The 1991 revision of the AQMP is expected to propose measures for reduction of particulates. Because there are few large sources of SO_2, H_2S, and sulfates in Monterey County, these pollutants are not expected to cause problems.

The vehicular emissions generated in the Monterey Peninsula region, as presented in Table 19-4, and other cumulatively substantial stationary emission sources, should be viewed in the context of future basin-wide contributions and the emission reductions and control strategies specified in the 1989 AQMP. The imminent 1991 revisions to the AQMP, which must comply with the very stringent control strategies of the 1988 California Clean Air Act and the 1990 Federal Clean Air Act Amendments, should also be considered. It is not possible at present to determine how estimated yearly emissions from the Peninsula area would actually affect basin-wide ambient air pollution concentrations. The MBUAPCD is currently developing a model that would translate quantified emissions (such as those presented in Table 19-4) into probable air pollution concentrations, but the model will not be available until sometime after adoption of the 1991 AQMP revisions. Therefore, there is no direct evidence available to the MPWMD to indicate that population increase supported by the proposed project would result in violations of applicable air quality standards.

Additionally, the MPWMD is neither a land use nor an air quality regulatory agency. It is impermissible for the agency to adopt restrictive development policies that are responsive to objectives unrelated to its legislatively mandated purposes and which supersede the proper

regulatory authority of designated resource agencies. The MPWMD should coordinate with the MBUAPCD in allocation of water to local jurisdictions, consistent with population projections of the AQMP, through its successive amendments, until such time as all applicable air quality standards are securely achieved. Adoption of this strategy would appear to be an adequate basis to support a finding that indirect project affects on air quality associated with population increase supported by the project would be less than significant.

19.6 SCHOOLS

This section of the report combines information about projected school enrollment and the capacity of Monterey Peninsula public schools in order to describe when and where overcrowding will occur. Although overcrowding is expected to be serious and chronic at Salinas Union High School, the majority of Peninsula school districts will be able to serve the needs of the estimated buildout population without a substantial financial outlay. Information presented here shows that, although capacity problems are likely at some facilities, there is generally excess capacity expected at other schools within the same district. It is likely, then, that the school districts could house most of the students with minimal capital cost by reassigning groups of students from one school to another. Therefore, indirect impacts on schools of population growth supported by the project would be less than significant.

AMBAG published a study entitled School Enrollment Projections: 1980-2020 in January 1986, which projected school enrollments by school district and grade levels to the year 2020.[8] This study forms the basis of the following assessment of school capacity on the Monterey Peninsula. In order to develop projections of the school-age population, AMBAG relied upon the Economic Base Model first developed by the agency and Recht-Hausrath Associates. Assumptions incorporated into the model are discussed in several AMBAG reports, these assumptions incorporate data reflecting birth rates and the aging of the population.

As discussed previously, AMBAG's growth forecasts are not directly comparable to the land use-based estimates included in this document for two reasons. AMBAG's published projections deal with the entire Monterey County, not individual cities, and AMBAG's unpublished projections for the Peninsula cities provide population but not dwelling unit forecasts only through the year 2020.

This report, on the other hand, estimates dwelling unit and employment increases for each city and unincorporated area of the Monterey Peninsula through buildout.

If one assumes that the number of persons per household in each city remains constant from 1980 through buildout, then a comparison of AMBAG figures with the estimates published in this document is possible. AMBAG population forecasts can be converted into projections of households and this household estimate can be compared to the EIP estimates. These estimates of growth are higher than AMBAG's in each of the cities and lower than AMBAG's in county areas. For the Peninsula as a whole, these estimates are slightly lower than AMBAG's.

AMBAG's school district enrollment projections can be viewed in light of the differences between the two sets of growth projections. After outlining the instances where EIP's estimates exceed AMBAG's, an average student-per-household ratio was applied to the difference in households projected by EIP and AMBAG. The number of students calculated according to these differences were then added to or subtracted from the AMBAG enrollment projections and evaluated in light of the capacity at each school district.

The following sections detail projected enrollment levels and capacity difficulties of each school district on the Monterey Peninsula when buildout is reached.

19.6.1 CARMEL UNIFIED SCHOOL DISTRICT

The Carmel Unified School District includes the communities of Carmel, part of Del Monte Forest, Carmel Valley and other unincorporated areas of Monterey County (Figure 19-3).

Elementary Schools

Carmel Unified schools serve grades K-5 in elementary school with a total capacity of 1,150 students. With planned growth, elementary school enrollment is estimated to increase steadily through buildout and peak with approximately 1,200 students (Table 19-6). Some overcrowding will occur and measures must be taken to offset it.

The School District recently reopened Carmelo School, using five classrooms for its child development program and leasing the remaining four classrooms to a non-profit theatre group.

FIGURE 19-3

SCHOOL DISTRICT BOUNDARIES

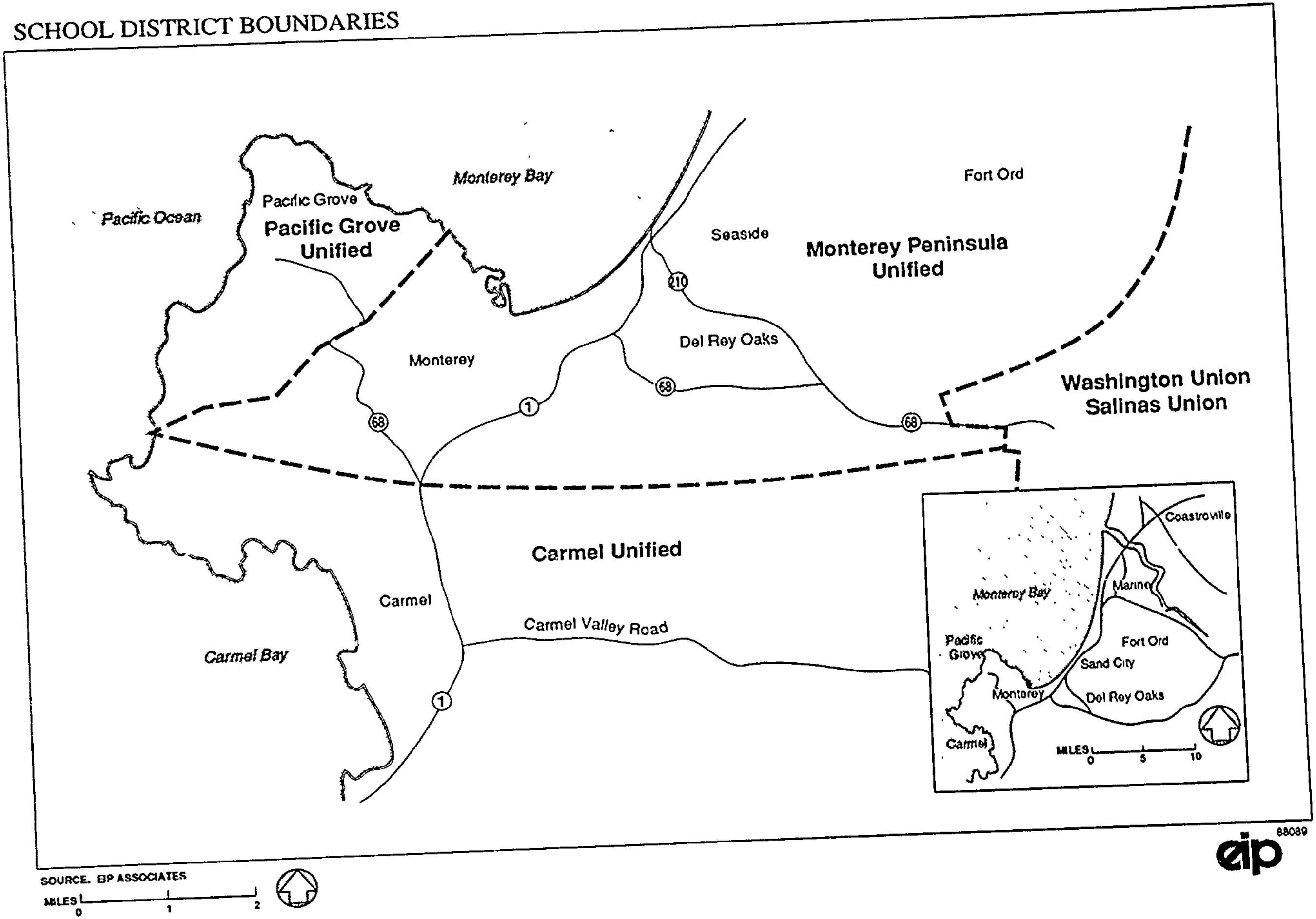


TABLE 19-6

SCHOOL ENROLLMENT FIGURES

	1988	Buildout	Capacity
Carmel Unified School District			
Elementary	948	1,209	1,150
Middle	416	531	910
High School	790	1,007	1,050
Total	2,154	2,747	3,110
Monterey Peninsula Unified School District			
Elementary	7,856	10,894	10,135
Middle	2,666	3,696	3,600
High School	2,862	3,968	3,100
Total	13,384	18,558	16,835
Pacific Grove Unified School District			
Elementary	1,131	1,539	1,351
Middle	486	661	600
High School	620	844	1,000
Total	2,237	3,044	2,951

Source: EIP Associates

Reopening the four classrooms used by the theatre group would ensure sufficient capacity through buildout. The School District notes, however, that reopening the school would require a new principal and administrative staff at the school site; the expense may not be justified in light of the small number of students needing space.[9] In that case, the School District could consider renting one or two portable classrooms for as long as necessary. Local developers could be assessed impact fees to cover this additional expense. Another solution for the District would be to reassign students from the elementary schools to the middle schools to take advantage of the extra space.

Middle Schools

No capacity problems are foreseen for Carmel School District middle schools, which have combined capacity of about 910 students. Enrollment is expected to rise steadily through the year 2004, when it peaks at 74 percent of capacity before declining again. Enrollment at buildout is anticipated to be only 531 students due to the declining birth rates in the area.

High School

No problems are projected in keeping enrollment within the 1,050 student facility. Enrollment is expected to rise fairly steadily through buildout, when it peaks at about 96 percent of capacity.

19.6.2 MONTEREY PENINSULA UNIFIED SCHOOL DISTRICT

The Monterey Peninsula Unified School District serves the communities of Del Rey Oaks, Fort Ord, Marina, Monterey, Sand City, Seaside and some unincorporated Monterey County areas (Figure 19-3). A major part of the School District's service area lies outside the scope of this study, it should be noted, therefore, that decisions affecting growth on the Peninsula may not change growth rates or policies in communities further to the north and may not totally alleviate the effects of growth on the School District.

Elementary Schools

Some capacity problems are foreseen for Monterey elementary school facilities, which have combined capacity of about 10,135 students, with the recent addition of five new classrooms at Crumpton Elementary. Enrollment is estimated to reach approximately 10,890 students at buildout,

exceeding capacity. It should be noted, however, that enrollment estimates are based on the assumption that the student per household ratio remains constant. The California Department of Finance projects declining birth rates for the project area, with school age children constituting a smaller percentage of the population.[10]

Middle Schools

With total capacity of about 3,600 students, slight capacity problems are foreseen for Monterey middle schools. Enrollment is expected to increase through buildout to a peak of approximately 3,696 students. One possible solution to the overcrowding would be for the District to add portable classrooms, since only a relatively small number of students would be involved. Local housing developers could be assessed impact fees to fund the temporary classroom rentals.

High School

Growth forecasts predict episodic overcrowding at the high school leading to buildout, with capacity problems at buildout. Enrollment at buildout is estimated to reach approximately 3,968 students, 128 percent of current capacity.

The overcrowding for the District as a whole may force construction of new permanent facilities to house the extra students if portable classrooms prove to be inadequate. Local housing developers could be assessed impact fees to help fund any needed capital improvement projects.

19.6.3 PACIFIC GROVE UNIFIED SCHOOL DISTRICT

The Pacific Grove Unified School District service area includes the City of Pacific Grove and a portion of Pebble Beach (Figure 19-3).

Elementary Schools

With the recent opening of the K Center that houses 251 students, the elementary schools possess a total capacity of 1,351 students. Enrollment is expected to exceed this total at buildout when there will be approximately 1,540 students.

The School District could consider reopening one or both of the closed elementary schools, which have a combined capacity of 2,100 students.[11] This option would result in additional costs of hiring new principals and administrative staff for each school site.

Middle Schools

The Pacific Grove middle school, with total capacity of 600 students, is expected to experience overcrowding throughout the period leading to buildout. The worst overcrowding would occur in 2020, when the school would operate at about 144 percent of capacity with 860 students enrolled. By the time buildout is reached, it is estimated that enrollment would drop to about 660, 110 percent of capacity.

The School District could consider reopening one or both of the closed elementary schools (combined capacity of 2,100 students) in order to house classrooms from the middle school. The elementary schools would have the capacity to house the extra students from both the elementary and middle schools at buildout.

High School

No capacity problems are foreseen in the high school, which has capacity for 1,000 students. Estimated enrollment at buildout is about 845 students, well within the capacity of the school

19.6.4 SALINAS UNION HIGH SCHOOL DISTRICT

The Salinas Union High School District (SUHSD) encompasses a large area around and including the City of Salinas. The SUHSD also includes a small portion of the Highway 68 area, but residents of only the Laguna Seca and Hidden Hills developments would attend this high school (Figure 19-3). Students from the study area would make up less than 4 percent of the SUHSD's enrollment during the forecast period, it is unlikely that development in the study area would significantly affect capacity at Salinas Union schools.

The Salinas high school facilities are overcrowded now and projected to become worse. AMBAG estimates that students will exceed available capacity by more than 2 to 1 by the year 2020.

Several solutions to relieve the chronic overcrowding are planned or underway. A new junior high school opened in the fall of 1988 with a capacity of 1,000 students, and the expansion of Alisal High was completed in 1988 to make room for an additional 300 students. The SUHSD has purchased a site in the northeast area of Salinas for a new school site, that facility is expected to open in 1992 with a capacity of 2,050 students.[12]

The SUHSD is also considering renting portable school classrooms or other space to relieve short-term crowding. In addition, it is possible that future attendance boundaries might change. In that case, some students, such as those in the Highway 68 area, could attend Monterey High School in the future. This last solution could exacerbate crowding at the Monterey facility unless appropriate action is taken by that school district. Regardless, another high school and middle school will be needed to accommodate the growing student population in the SUHSD.

19.6.5 WASHINGTON UNION SCHOOL DISTRICT

Washington Union School District (WUSD) boundaries encompass primarily some unincorporated areas of the County, including part of the Highway 68 area and Toro Park (Figure 19-3). Residents of the study area that would attend schools in the WUSD would live in Laguna Seca and Hidden Hills.

The WUSD has added a new building to its school site that is expected to serve the additional student population in the District at buildout.[13] If necessary, WUSD could lease portable facilities for the few years when enrollment levels may approach capacity Local developers could be assessed impact fees to pay for this extra operating expense.

19.7 SOLID WASTE

The Monterey Regional Waste Management District (MRWMD) service district extends from Castroville to Big Sur and serves the entire Peninsula, including Fort Ord. Although Fort Ord closed its own la ill and is now served by MRWMD, negotiations are still taking place regarding Fort Ord's financial contribution to the District. There is also the possibility the MRWMD would collect and dispose of solid waste from the Salinas area if north County landfill sites close.[14]

The MRWMD operates a landfill near Marina, which is located approximately two miles north of the City and one mile east of Highway 1. The Marina landfill has approximately 80 years of available capacity, assuming current growth rates.[15] The estimates for planned growth included in this document are consistent with the MRWMD's growth assumption, so it is evident that Monterey Peninsula planned development would not exceed the landfill's capacity within the time span of concern to this document. Finally, planning processes under the jurisdiction of the California Integrated Waste Management Board are adequate to assure provision of suitable solid waste disposal services upon eventual closure of the present landfill. Therefore, indirect impacts on solid waste facilities of population growth supported by the project would be less than significant.

19.8 WASTEWATER

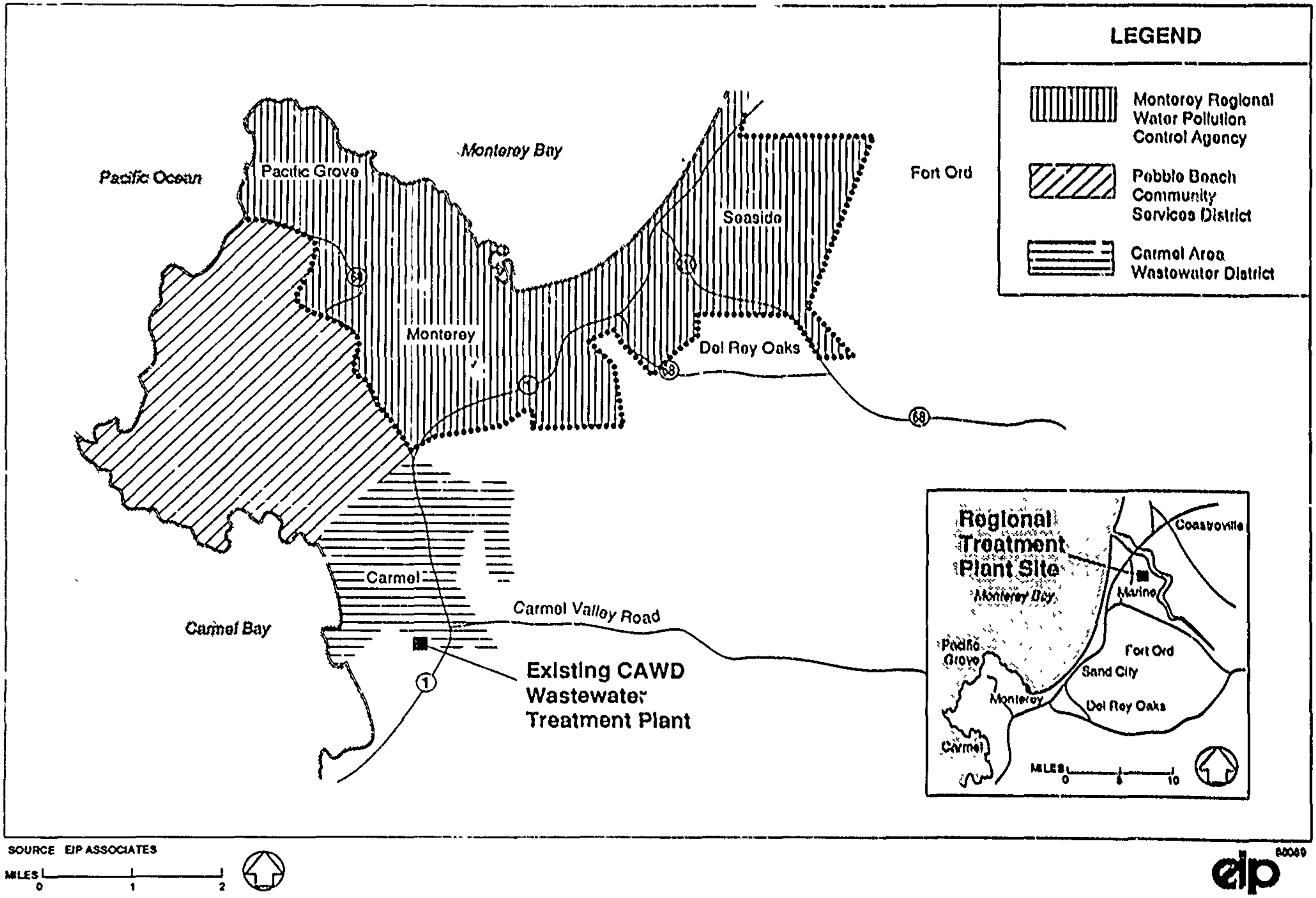
19.8.1 MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY

The Monterey Regional Water Pollution Control Agency service area (within the Monterey Peninsula Water Management District service area) includes the communities of Del Rey Oaks, Monterey, Pacific Grove, Sand City and Seaside. It also serves Boronda, Castroville, Fort Ord, Marina, areas of Monterey County, Moss Landing and Salinas (Figure 19-4).

The Agency has consolidated five treatment plants into one regional facility and added an expansion element to bring total plant capacity to 29.6 million gallons per day (MGD). Operations of the regional treatment plant are currently restricted under terms of a Monterey County conditional use permit that limits the maximum amount of sewage that can be treated to 25 MGD. An additional expansion of plant capacity to 37 MGD can be utilized when needed and if approved by the County This additional capacity would be sufficient to treat wastewater in the Agency's service area through buildout.[16] (See Section 19.9.3 for a discussion of wastewater facility expansion financing.) The plant is also restricted in that it is not allowed to serve a greater population than is forecast in the MBUAPCD's Air Quality Plan for the Monterey Bay region. Population projections to be used in this plan are forecast by AMBAG. AMBAG has projected population growth through 2020 and this analysis examines the buildout conditions. Since it is uncertain when buildout will be reached, it is impossible to determine if the plant's future operation would be restricted.

SANITATION DISTRICT SERVICE AREAS

FIGURE 19-4



19.8.2 CARMEL AREA WASTEWATER DISTRICT

The Carmel Area Wastewater District (CAWD) service area includes the City of Carmel and unincorporated County areas south along the coast approximately to Highlands Inn and east into Carmel Valley approximately to Valley Greens Drive (Figure 19-4).

The CAWD has upgraded its treatment plant to facilitate wastewater reclamation. Plant capacity was also increased to 4.0 MGD from its previous rating of 2.4 MGD. The CAWD retains ownership of two-thirds of the plant's capacity and the remainder is used by the Pebble Beach Community Services District. The CAWD states that the plant will now accommodate all growth within the service area through buildout.[17]

The Carmel Area Wastewater District, the Pebble Beach Community Services District and the Monterey Peninsula Water Management District are cooperating in the development of a water reclamation facility at the CAWD treatment plant site. CAWD estimates that construction of the reclamation facility will be completed in 1993, and that it will produce about 800 AF/year of reclaimed water to be used on golf courses and other open space in Pebble Beach. Three private fiscal sponsors would finance the $13 to $15 million project in return for a potable water entitlement of up to 380 AF/year from the MPWMD, to be used to develop currently vacant lands in the Cal-AM service area. The remaining 420 AF of potable water "saved" by the reclamation project would be available to the MPWMD as a drought reserve or allocated for municipal water use.[18]

19.8.3 PEBBLE BEACH COMMUNITY SERVICES DISTRICT

The Pebble Beach Community Services District (PBCSD) serves the Del Monte Forest Area (Figure 19-4). As noted above, the PBCSD owns one-third the capacity of the CAWD/PBCSD joint treatment plant. PBCSD officials note that growth consistent with current General Plans and the Coastal Plan will be served adequately by the expanded facility through buildout.[19] Capacity problems could occur, however, if there is extensive construction of "granny flats" senior citizens' housing in the future. Such construction would be regulated by County ordinance and is currently not authorized under County zoning regulations.

19.8.4 SEPTIC SYSTEMS

Much of the Carmel Valley area is served by septic systems. A 1982 Montgomery Engineers report detailed potential problems with groundwater contamination due to overuse of septic systems in the Valley.[20] This report stated that septic system capacity was already met in the Carmel Valley Village and Schulte Road areas. Future capacity problems could be avoided by limiting dwelling units in the Valley to 9,540 homes which is well above the 6,202 units allowed under the current General Plan for the area, avoiding development in the most sensitive areas, and supplementing septic systems or tie-ins to existing systems where necessary. As long as development of environmentally sensitive areas is avoided, as noted in the Carmel Valley Master Plan, it is not likely that there would be septic system capacity problems in the Carmel Valley.[21]

It should be noted that in addition to Carmel Valley, septic systems are also present in Sand City. It appears that these systems function properly at this time.

19.8.5 CONCLUSION

Sewage treatment capacity appears to exist that is adequate to meet State and federal treatment requirements and which can support planned buildout population of Peninsula communities. Therefore, indirect impacts on wastewater treatment infrastructure of population growth supported by the project would be less than significant.

19.9 FISCAL IMPACTS

19.9.1 INTRODUCTION

The purpose of this part of the study is 1) to provide information regarding the relative fiscal impacts of growth on the cities compared with their current fiscal status, and 2) to discuss the regional infrastructure that must be constructed to accommodate the growth.

This discussion addresses only the indirect fiscal effects associated with growth in the study area, and does not discuss the socioeconomic impacts of financing the water supply alternatives. Financing for water supply projects is addressed in Chapters 4 and 18 of this report.

19.9.2 FISCAL IMPACTS TO CITIES

In any municipal jurisdiction, new growth generates additional public revenues through increases in property valuation, retail sales, or use of services for which fees or franchise taxes are charged. New growth also increases the demand for public services and thus raises the cost of government. The cost to government will include the operating expenses that recur annually, but may also include one-time capital expenditures necessary to upgrade a city's infrastructure such as streets, water and sewer systems, or facilities like libraries or fire stations.

The relationship between annual costs and revenues generated by each land use type may remain relatively stable over time as the community grows, assuming the basic rules for collecting revenues do not change as happened when Proposition 13 was passed. However, the need for capital expenses depends upon the city's existing service capacities. Once installed, most capital projects serve a large increment of growth occurring over a number of years. Thus, the capital budget tends to be more "bulky" and less uniform across communities.

The approach in this analysis has been to separate the issue of annual operating costs from capital projects. The analysis projects the relationship between annual government costs and revenues into the future based on estimated changes in the land use mix for each of the cities in the study area. The focus is to determine whether the cities would be benefitted or adversely affected relative to their current fiscal status as a result of the growth estimated. Capital projects are discussed on the basis of information supplied by each of the cities and are not projected directly on the basis of the land use estimates done for the study. The unincorporated County areas have not been included in this analysis due to the difficulty of separating the Peninsula portion of the County out of the total County budget.

In order to estimate the annual cost/revenue impacts of growth on the cities, municipal funds were allocated by residential and commercial land uses. Table 19-7 shows an example of this exercise for the City of Carmel. The 1986-87 budget total shows the general fund budget for Carmel. The budget is approximately balanced. The ratio of revenues to costs at the bottom of the table is therefore shown as 1.00, meaning that for each dollar of expense, a dollar of revenue is shown in

TABLE 19-7

EXAMPLE OF BUDGET BREAKDOWN BY LAND USE
CITY OF CARMEL
FISCAL ANALYSIS
1986-87 BUDGET

	Total	Residential	Commercial
Revenues			
Property Tax	$ 712,054	$ 457,850	$ 254,204
Sales Tax	1,556,017	0	1,556,017
Utility/Franchise	63,791	45,993	17,798
Occupancy	2,525,307	0	2,525,307
Licenses/Permits	389,247	54,496	334,752
Other Agencies	360,247	360,247	0
Other	1,330,789	1,330,789	0
Total	$6,937,452	$2,249,375	$4,688,078
Costs			
General Government	$1,566,745	$1,059,120	$ 507,625
Police	1,410,224	953,311	456,913
Fire	528,713	339,962	188,751
Community Planning	334,735	226,281	108,454
Public Works	1,233,844	0	1,233,844
Capital Improvement	1,099,000	742,924	356,076
Cultural/Recreational	349,589	349,589	0
Library	414,602	414,602	0
Total	$6,937,452	$4,085,789	$2,851,663
Balance	$0	$(1,836,414)	$1,836,415
Ratio of Revenues to Costs	1.00	0.55	1.64

the budget. The ratio of 1.00 is not intended to imply that Carmel necessarily has all the revenue it needs to provide what it considers an adequate level of service; rather, the ratio simply reflects the current balance between costs and revenues.

Since the land use estimates for the study are divided by housing units and employment, it is important to consider the contribution made by each land use to the fiscal status of Carmel. This has been done in the remaining two columns in Table 19-7. On the revenue side, certain funds are generated by only one land use type, in other cases the contribution is shared. Sales taxes and hotel occupancy taxes are generated only by commercial and hotel properties. State subventions, part of the category listed as "Other Agencies," are generally allocated on the basis of residential population. Property taxes, on the other hand, are paid by all kinds of property. The County Assessor does not keep records of the distribution of assessed value for different types of land uses. To allocate these revenues among the two land use types, EIP made assumptions regarding the average values of residential and commercial properties. The average values were then applied to 1985 land use inventory data to calculate an approximate percentage weight for commercial and residential assessed values. This weight was then multiplied by the property tax revenues shown in the budget.

The costs were allocated using average factors calculated either on the basis of relative assessed value or the relationship between population and employment in Carmel. The visitor population in hotels was also factored into the service costs attributable to the commercial sector.

The ratios shown at the bottom of Table 19-7 indicate that residential development requires more in costs for services than it returns in revenues, while for commercial development, the opposite relationship is true. The 0.55 in the residential column means that revenues generated by existing residential units is only 55 percent of the costs of current services to serve the residential population. In the commercial column, it can be seen that revenues are nearly double costs A major reason for this result is that commercial activity generates large amounts of revenues in addition to the property tax, but does not generate extraordinary costs for services.

Similar calculations have been done for each of the cities as summarized in Table 19-8. In every case, commercial development returns a better fiscal balance than residential development. This

TABLE 19-8

EXISTING RATIOS OF GOVERNMENT GENERAL FUND REVENUES AND COSTS GENERATED BY RESIDENTIAL AND COMMERCIAL LAND USES FOR CITIES IN THE STUDY AREA[1]

	Total	Residential	Commercial
Carmel	1.00	0.55	1.64
Del Rey Oaks	1.00	0.58	2.17
Monterey	1.05	0.41	1.81
Pacific Grove	1.00	0.67	1.98
Sand City	1.03	0.70	1.08
Seaside (Cal-Am)	1.01	0.73	2.24
Seaside (Non Cal-Am)	0.86	0.73	2.24

[1] The figures in the table represent the ratio of general government revenues to costs. A ratio of 1.00 means that revenues and costs are exactly balanced. A ratio less than 1.00 (e.g., 0.61) means that costs generated by that land use exceed the revenues generated. A ratio higher than 1.00 means that revenues are higher than costs.

Source: EIP Associates

is significant because the regional buildout estimates show relatively high levels of employment growth in relation to housing growth. Table 19-9 shows how changes occur as a result of growth. Comparison of the left hand and right hand columns, which show the 1988 and buildout ratios respectively, indicates that all of the cities improve over their current situation if planned growth occurs, with the exception that Sand City drops about 14% and Pacific Grove dips slightly due to the large increase in residential development.

The significance of these results varies with each city depending upon the current adequacy of services and the need for capital improvements. The City of Carmel is undertaking an on-going capital improvement program for street maintenance and drainage improvements.[22] The current road and drainage system is severely under-designed to handle the volume of current traffic and development. The character of growth in the near term and the projected relationship of costs and revenues may further strain the City's ability to raise revenues for these capital projects.

The City of Pacific Grove currently is under-staffed to provide the desired level of City services.[23] The increase in Pacific Grove's costs relative to revenues through buildout will further exacerbate this situation.

The City of Del Rey Oaks was recently forced to dip into cash reserves to balance the budget.[24] The increase in hotel and commercial development should prevent the need for this in the future.

The City of Monterey has established an ambitious capital improvements program. The continued improvement in Monterey's cost/revenue balance contributed by the projected growth suggests that ample revenues can be accrued for this program.

Three military facilities are located within the City of Monterey: the Presidio of Monterey, the Naval Post Graduate School, and the local Coast Guard facility. The Presidio of Monterey, operated by the U.S. Army, houses the Defense Language Institute, a military foreign language facility. The U.S. Army recently completed a new master plan for the 400-acre installation that would consolidate its military language institutes nationwide at the Presidio of Monterey.

The U S Navy operates the Naval Post Graduate School as a training site for U.S. Naval Officers. The School includes learning facilities and a residential compound to accommodate an enrollment

TABLE 19-9

EXISTING AND ESTIMATED RATIOS OF GOVERNMENT GENERAL FUND REVENUES AND COSTS FOR CITIES WITHIN THE STUDY AREA

City	1988 Ratio	Buildout Ratio
Carmel	1.00	1.02
Del Rey Oaks	1.00	1.06
Monterey	1.05	1.03
Monterey Research Park	0.00	1.14
Pacific Grove	1.00	0.99
Sand City	1.03	0 88
Seaside		
Cal-Am	1.01	1.16
Non Cal-Am	0.86	0.88

Source· EIP Associates

of approximately 1,850 persons. A recently adopted master plan calls for the expansion of School facilities to adapt to current enrollment pressures. The U.S. Coast Guard maintains a force of approximately 100 persons in Monterey. These personnel provide administrative support for both the Naval Post Graduate School and Coast Guard operations. No expansions of personnel or facilities are presently planned by the Coast Guard.

The land use estimates used for estimating population and employment growth in the District factored in the projected expansions at three military facilities. The military facilities pay no property tax, so the largest revenue accruing to the City of Monterey General Fund results from retail sales taxes on off-base entertainment spending by military personnel. This amount represents only a small percentage of total sales tax revenue received by the City of Monterey. The Presidio of Monterey pays the City of Monterey a sewer line maintenance fee to offset the costs of upkeep of sewer lines serving the facility.[25] Thus, the impact of the military facilities on the General Revenue and Expenditures for the City of Monterey is included in this analysis.

The City of Seaside will gain substantially from the type of commercial and hotel development planned for Seaside. However, significant capital costs will be required to implement the core of this development. For example, the dredging of the Laguna Grande lagoon is estimated to cost $3.5 million. Seaside will fund a portion of the cost with a Coastal Conservancy Grant of $1.2 million and a Tax Increment Grant from the Laguna Grande Redevelopment Area, leaving $800,000 still in escrow.[26]

While the balance of growth in jobs and housing on the Peninsula generally results in favorable fiscal results for cities there, the Salinas and Marina areas, which would supply the additional labor force, may not benefit fiscally. The growth scenarios would result in increased housing growth in these communities without necessarily boosting job growth. This situation could adversely impact the fiscal health of Marina and Salinas unless they take independent measures to plan for the influx of residents and balance their own community growth with additional economic development projects.

19.9.3 REGIONAL CAPITAL IMPROVEMENTS

Traffic Improvements

A number of major roadway improvements are forecast in order to accommodate projected traffic levels. The traffic analysis examines several planned improvements that would increase the Level of Service, although not all of these have as yet been funded. The planned improvements include:

- Hatton Canyon Freeway construction;
- Carmel Valley Road widening from State Route 1 to Carmel Rancho Boulevard and from Via Petra to Valley Greens Road;
- Holman Highway widening to four lanes;
- State Route 68 widening from its eastern junction with State Route 1 to Los Laureles Grade, and;
- State Route 1 widening from Route 68 to Ord Village.

Cost estimates have been prepared for several of these projects. The Hatton Canyon Freeway is projected to cost approximately $27 million. The widening of Holman Highway has a projected cost of approximately $15 million. Cost estimates for long-term projects include the widening of State Routes 68 and 1. The upgrading of State Route 68 to a four-lane expressway could be completed by 2030 at a cost of $60 million, and further improvement to a four-lane freeway could be implemented by 2050 at a cost of $10 million. These projects on average would cost about $2 million per lane mile. This cost would be greater on sections that involve features such as bridges and interchanges, but based on this average, $2 million per mile, the projects listed could cost about $137 million by 2010.

These improvements involve mainly highways on the Monterey Peninsula. Monterey County could reasonably expect to receive about $161 million in street and highway funding for projects throughout the County by the year 2010. Other projects in the area expected to be completed by 2010 for which cost estimates are available include the Prunedale Bypass at $88 million. The Monterey County Transportation Commission (MCTC) recently established a policy stating that at least one-half of all incoming highway project funds would be allocated toward completion of the Prunedale Bypass.

In addition to the improvements listed above, further improvements will be necessary to accommodate projected growth.

- o Add two additional lanes to State Route 1 between Carmel Hill and the eastern interchange with Highway 68 (This item is listed as two separate links in the traffic analysis, Section 19.3.)
- o Add two lanes on Highway 68 between the eastern interchange with State Route 1 and State Route 219.
- o An additional upgrade of the Holman Highway from a four-lane highway as proposed above in the planned improvements to a four-lane freeway.

Based on the average costs of $2 million per lane mile, the first two improvements would cost approximately $36 million. The second Holman Highway improvement project would involve additional cost as well, but the potential complexity of the design does not permit any estimate of cost at this time. The cost estimates discussed here are intended only to provide illustrative information, since detailed designs of the proposed improvements have not been prepared.

Since the improvements discussed here are all on state highways, the projects would qualify for federal aid. Most of the projects could apply for Federal Aid Primary, which funds up to 90 percent of the project with federal money and 10 percent with state money. No local match of funds is required for these grants. The Holman Highway project would need to use Federal Aid Secondary funds which are ordinarily used for street improvements by the cities and the county. Under the funding process for Federal Aid Primary, each project must be included in the State Transportation Improvement Program (STIP) which sets out a five-year schedule for projects. Each new project is put in the fifth year of the program, which results in an automatic five-year lag between a project's inclusion in the STIP and its actual funding period. Currently, the only project on the Monterey Peninsula in the STIP is the Hatton Canyon Freeway.

Projects are proposed to the state by local jurisdictions so that local control is maintained for setting priorities for the expenditure of available funds. However, the amount and timing of funds is under state control as the state must balance the needs of all California jurisdictions. Currently, the top priority for Monterey County is the Highway 101 bypass in North County mentioned above (Prunedale Bypass) which is on a 10 to 15 year timeline.

There have been no indications that the Federal Aid Primary program will be substantially changed due to recent budget actions at the federal level. However, it is clear from the administrative procedures implementing the program that, at best, it is a long range funding source for the improvements discussed here.

Other local options for generating funds for highway improvements have been considered in the County, including a development impact fee and an increase in the sales tax which could be dedicated to regional transportation projects. These funding mechanisms have been implemented in other regions and have generated substantial and well-targeted revenues to complete regional and local improvements. The increase in the sales tax for transportation projects was recently rejected by the County Board of Supervisors in favor of a general sales tax increase to be spent at the discretion of the County.

Finally, gasoline tax subventions to local jurisdictions could be used to fund identified highway system improvement needs. These revenues, approved by the State's voters in June 1990 (Proposition 111 and 108) may be distributed upon development and implementation of a Congestion Management Plan (CMP) by the Monterey County Transportation Commission which has been appointed as the Congestion Management Agency (CMA) for Monterey County. Monterey County and Peninsula cities would be eligible for receipt of their portion of about $3 million set aside for local government improvement of regional highways and principal arterials. A CMP must contain an number of elements that will guide local development decisions:

- specification of minimum LOS standards for state highways and principal arterials reflecting specific intensities of land uses (but no less than LOS E or existing conditions if worse than LOS E);
- standards for the frequency, routing and coordination of public transit;
- a trip reduction program that promotes alternative transportation methods, improvements in the jobs/housing balance and other strategies;
- a program analyzing the regional transportation impacts of local land use decisions; and
- a seven-year capital improvement program, to maintain or improve traffic and transit, linked to regional transportation and air quality mitigation measures.

Once target service levels are established, failure of local governments to maintain them can result in a finding of non-compliance by the CMA. This finding would result in cut-off of gasoline tax subvention funds from the State controller to the local jurisdiction. Additionally, local jurisdictions in non-compliance would be ineligible to receive Flexible Congestion Relief and Urban Commuter Rail Funds, Traffic System Management Funds and other State and federal grants supporting locally oriented projects identified in Regional Transportation Improvement Programs. Conceivably, modification of water allocations to such jurisdictions could constitute one strategy for achieving compliance with CMP goals. Such action would require approval of the District's electorate.

In order to accommodate planned growth through buildout, the Monterey Peninsula region needs to set clear priorities for improving the transportation system, and needs to quickly set in motion the procedures for securing sufficient funds. Future growth in the District would be threatened by a lack of infrastructure improvements. Traffic problems would limit the ability of commuters to reach their places of employment in an expeditious fashion, which could hinder economic growth. Lifestyle patterns would have to be changed to adapt to the limited mobility caused by the traffic levels on highways and major arterials on the Monterey Peninsula Resulting congestion could further impair prospects for attainment of air quality standards.

The congestion management planning and funding structure is clearly a major step in ensuring that projected buildout population increases would be matched by improvement of critical transportation system infrastructure within the region. Together with other existing road improvement programs and funding sources, including levy of developer fees, and the programs discussed above, the CMP process could provide an adequate basis to find that the indirect transportation impacts of growth supported by the project could be mitigated to a less than significant level by construction of system improvements, or phasing of, or limitation of, trip growth within the region

<u>Regional Sanitation Improvements</u>

The Monterey Regional Water Pollution Control Agency (MRWPCA) and the Carmel Area Wastewater District (CAWD) have expanded their sewage treatment plants to meet the demands of increased growth on the Monterey Peninsula The expansions needed for the sewage treatment plants were programmed from a combination of local capital reserves and federal grants. The MRWPCA recently replaced five outdated plants with one large plant that has 20 9 MGD capacity

The financing for this project came from a federal grant (69 percent) and from the agency's capital revenues.

The agency then further expanded plant capacity to 29.6 MGD. An additional expansion to 37 MGD is available and should accommodate growth through buildout. The cost of these expansions will total $11.3 million (1985 dollars). The agency plans to utilize connection fees to finance these projects.

The Carmel Area Wastewater District completed improvements to their treatment plant that will allow processing of 4 MGD, a capacity adequate for buildout projections of planned growth. The project cost $6.6 million, 88 percent of which was funded with an EPA grant, given for the purpose of upgrading the level of treatment at the plant.

Adequate funding mechanisms appear in place to complete necessary improvements to the regional sewage treatment system to accommodate planned growth allowed by a new water supply project.

19.10 SOCIAL IMPACTS

Based upon January 1988 general plan policies and the availability of suitable land, certain cities and unincorporated areas within the MPWMD appear to have more potential for growth than others. Specific water demand projections are discussed in Chapter 2 and the following discussion generally characterizes the residential and employment growth potential in each of the communities as well as an analysis of overall residential and commercial trends in the District.

For the District as a whole, and for the Cal-Am area, it is clear that the commercial sector could grow over two times as much as the residential sector if buildout is achieved. Table 19-1 summarizes housing and population estimates through buildout for individual communities and the District. Table 19-2 summarizes employment estimates for individual communities and the District through buildout. Residential growth (single-family and multi-family units) could be about 35 percent compared to an additional 75 percent for commercial growth.

Multi family units could dominate the growth in the residential sector. Estimates show that about 75 percent of new dwellings could be multi-family units (78 percent in Cal-Am), resulting in a

different proportion of single-family units and multi-family units than presently exists. Currently it is about 2:1 single-family; at buildout it could be closer to 1:1 (55 percent to 45 percent range). The character of the area would change if fewer families owned their homes. The density of the residential population could increase and the higher transiency rate associated with multi-family units could lead to greater turnover in the community.

In the cities, estimated single-family unit increases are modest: a 5 percent loss in Monterey to a 14 percent gain in Carmel. A notable exception is the unincorporated areas, where the number of single-family units would increase by 33 percent in Cal-Am areas and 102 percent in non Cal-Am areas if buildout is achieved.

Conversely, in cities the increases in multi-family units could be significant: an increase of 24 percent in Seaside to 96 percent in Pacific Grove. Sand City and Del Rey Oaks could increase multi-family units by 114 times and 16 times, respectively. The absolute increase (2,594) is substantial in Sand City, but is not substantial in Del Rey Oaks. The residential character of Sand City could be dramatically changed by this sharp increase in multi-family units with fewer home owners and more renters. The density of the residential population would increase with an increase in multi-family units.

Sand City is the jurisdiction whose plans call for the fastest growth of all the communities studied. Sand City's development plans include about 1,500 hotel rooms (43 percent of all new hotel rooms in the District), over 2,600 multi-family units (22 percent of all new multi-family units), and about 3,200 other commercial jobs. Sand City currently has zero hotel rooms, 23 multi-family units, and 1,550 jobs.

In the unincorporated areas, the Highway 68 area has significant growth potential as it is the corridor connecting the Monterey Peninsula with the county seat of Salinas. The Carmel Valley is an another area with high growth potential.

The 75 percent growth in employment could add 34,721 new jobs in the District. The preponderant commercial sector, with nearly 87 percent of the existing employees in the District, could increase to 89 percent at buildout. Tourist oriented facilities are included in the commercial sector, but a substantial portion is office and general retail. Major employment expansions

anticipated at the airport (office and industrial) and at the Monterey Research Park (office, warehouse, and light industrial) would account for nearly 27 percent of all new commercial employment and about 10 percent of all types of employment at buildout.

Tourism and its related industries play an important part in the District's economy and would continue through buildout as the number of hotel rooms is increased by nearly 40 percent over 1988 levels. This positive economic impact would carry over to other visitor oriented businesses such as retail shops, restaurants, and tours. However, data do not show that hotels alone dominate the local economy and would not do so at buildout. Hotel employees comprised 12 percent of the total employees within the District in 1988, and this number could drop to 10 percent at buildout. The number of hotel employees in 1988 could increase by 48 percent through buildout compared to a 79 percent increase in total commercial employment in the District. It should be noted that many hotels have already been constructed in the period 1988 to 1991, or are presently under construction.

The disparity in the growth rates for the residential and commercial sectors would have far reaching implications within the District. The area is currently a single function residential and economic community. The preponderance of single-family units reinforces the bedroom and retirement community image, while tourism constitutes the largest economic activity in the District.

The proportionately higher growth rates of the commercial sector and the number of multi-family units would diversify the area. The increase in jobs would draw new residents to the District and current land use patterns would require multi-family units to meet the housing demand. The multi-family units would increase the density of the residential population and draw a broader range of socioeconomic groups. The increase in jobs would also increase the number of employees commuting from outside the District, exacerbating the already poor traffic conditions. A more detailed assessment of the traffic situation is set forth in Sections 19.4 and 19.9.3. The increased urbanization would be accompanied by an associated increase in congestion and demand for public services that would require attention by planners and policy makers.

19.11 OTHER INDIRECT IMPACTS

In addition to the direct impacts of growth discussed above, the future growth associated with a water supply project would have indirect impacts on water quality, vegetation and wildlife, noise, and fire and police services within the District.

Current water sources within the District are the existing San Clemente Dam and groundwater. A new water supply project would increase the supply of surface water and lessen the dependence on groundwater sources which would improve water quality. The growth estimated for the District would increase pressure on the wastewater treatment facilities, but expansions to these plants would be able to accommodate the increased flow. Leakage from septic tanks in the Carmel Valley could threaten water quality in aquifers, but future development of the Carmel Valley is highly regulated and would limit dwelling units to a safe number.

Future growth would impact vegetation and wildlife within the District. The biggest impact would occur in the currently undeveloped areas of the District. Changes in land use to accommodate future growth would remove open space areas and wildlife habitat. Local jurisdictions should regulate and monitor future development to limit the impact on habitat areas and to ensure that rare and endangered species would not be affected.

The future growth estimated for the District would bring an accompanying increase in noise levels. Noise during construction of new roadways, commercial units, and residential units would affect surrounding areas. Local jurisdictions should take measures to ensure that noise reduction devices are used on all heavy equipment during construction projects.

The growth would also require increased levels of fire and police protection. Some jurisdictions would be required to invest in new capital equipment and personnel to maintain existing service standards. Local jurisdictions must ensure that tax revenues and user fees from future projects would be sufficient to cover the costs of expanded service. Local jurisdictions must also regulate future development projects to ensure that adequate access routes would be implemented

19.12 MITIGATION MEASURES

The adverse environmental effects of growth in the Monterey Peninsula could be lessened by the implementation of various mitigation measures. Measures within the scope of the MPWMD's authority include:

- phasing of allocation of water to be consistent with Air Quality Management Plans
- consider coordinating the phasing of allocated water with development of traffic infrastructure to help meet goals of the Traffic Congestion Management Plan.

Measures outside the scope of MPWMD's authority include:

- support by MPWMD of efforts to coordinate infrastructure and land use planning on County and regional levels;
- imposition of more stringent vehicular and stationary source air pollutant controls;
- transportation system management (TSM) measures including encouragement of car- and vanpooling, provision of parking lots at transit stops, provision of exclusive carpool and bus lanes, etc.;
- restriction on the use of packaging materials, increased use of returnable beverage containers, prohibition of disposable diapers, and other measures to reduce the volume of the urban solid waste streams.

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20. IDENTIFICATION OF LEAST DAMAGING, ENVIRONMENTALLY PREFERABLE FEASIBLE, AND OVERALL PREFERRED ALTERNATIVES

20.1 LEAST DAMAGING ALTERNATIVE (CEQA)

Of the 10 alternatives analyzed in this EIR/EIS, the No Project alternative would be the least damaging alternative in terms of avoidance of the site-specific impacts that would be associated with any of the other water supply alternatives. The No Project alternative would not meet the basic water supply purpose, and is thus not considered a feasible alternative from the federal (NEPA) perspective. In addition, the No Project alternative would do nothing to improve the unsatisfactory conditions of the Carmel River, where current water consumption has resulted in significant adverse impacts to riparian vegetation and aquatic life.[1] The 16 NLP/D alternative is considered the least damaging feasible alternative, as described below.

20.2 ENVIRONMENTALLY PREFERABLE FEASIBLE ALTERNATIVE (NEPA)

The environmentally preferable feasible alternative is a federal definition that refers to the practicable alternative that would have the least environmental consequences prior to mitigation. The Clean Water Act, Section 404(b)(1) Guidelines defines "practicable" as "available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes."

Based on an analysis conducted in July 1991 in accordance with the Clean Water Act, Section 404(b)(1) Compliance Evaluation (on file in the U.S. Army Corps of Engineers' San Francisco District office), only three of the 10 alternatives analyzed in the EIR/EIS are considered to be practicable -- the 24 NLP, 16 NLP/D, and 23 NSC alternatives. The remaining alternatives are not considered to be practicable because they fail to meet the water supply purpose, are too costly,

have questionable site availability, are constrained by logistical factors, and/or do not meet the 404(b)(1) Guidelines with respect to "other significant adverse environmental consequences."

24,000 AF New Los Padres Reservoir and 23,000 AF New San Clemente Reservoir

As shown in Tables S-1, S-2 and S-5, the 24 NLP and 23 NSC alternatives would inundate the most habitat, but would also result in the greatest pre-mitigation benefits to hydrology (year-round streamflow and high ground water levels), riparian vegetation and wildlife habitat, the lagoon, fish, visual resources and river-based recreation. The downstream benefits would significantly improve the existing situation (and, in some cases, equal or better than "natural" conditions). Of the two, 24 NLP is considered environmentally superior because its location and topography result in about 40 percent fewer acres of riparian inundation, less fish habitat inundation, an improvement to inadequate fish passage facilities at the existing Los Padres Dam and instream flow benefits to six more miles of the Carmel River.

16,000 AF New Los Padres Reservoir/Desalination

The 16 NLP/D alternative would entail riparian inundation impacts that are similar to the 9 NLP/D, and fish habitat impacts that are intermediate between 24 NLP and 9 NLP/D (see Tables S-1 and S-3) The 16 NLP/D alternative would provide many of the pre-mitigation benefits of the 24 NLP alternative, but not to the same degree. For example, streamflow would occur in eight out of 12 months in critically dry years, not year-round as with the 24 NLP project. Similarly, the 16 NLP/D alternative would result in benefits to riparian vegetation in the lower Carmel River in normal and wet years, but not in critically dry years as with 24 NLP.

The 16 NLP/D also includes a 3 MGD desalination plant as an integral component. Based on a feasibility study completed in July 1991, a separate Desalination Project EIR has been initiated to study the site-specific impacts of desalination at two sites.

Determination

Based on the pre-mitigation impacts of the three practicable alternatives described above, it appears that the 16,000 AF New Los Padres Reservoir/Desalination project would be the environmentally

preferable feasible alternative, if a 3 MGD desalination plant is confirmed as feasible. The 16 NLP/D would have less inundation impacts than the 24 NLP alternative and would provide substantial environmental benefits to the degraded lower Carmel Valley, even though these benefits would be reduced in critically dry years.

It should be noted that this designation is tentative for two reasons. First, the regional and site-specific impacts of a desalination plant are being analyzed in a separate Desalination Project EIR that is underway as part of the District's Interim Water Supply Program. The project description and costs of the desalination project will be refined to the Preliminary Design level, based on engineering efforts beginning in September 1991. Second, a different size of New Los Padres Reservoir may be necessary, based on optimization studies that will be performed for the Final EIR/EIS.

20.3 OVERALL PREFERRED ALTERNATIVE

The overall preferred alternative is the project selected by MPWMD, based on environmental impacts and benefits as well as water supply performance, cost, reliability, and other factors. The overall preferred alternative need not be identified in a Draft or Supplemental Draft EIR/EIS, but must be identified in a Final EIR/EIS.

A specific overall preferred project is not identified in this Supplemental Draft EIR/EIS due to the need to confirm the feasibility of a 3 MGD desalination project, which is being analyzed further as part of a separate Interim Water Supply Program. Thus, the District's designation at this time is a New Los Padres Reservoir in the size range of 16,000 AF to 24,000 AF. The final reservoir size selection will depend primarily upon the feasibility of the 3 MGD desalination plant.

The selection of the overall preferred alternative will be made prior to issuing the Final EIR/EIS, based on optimization studies that incorporate inflow data subsequent to September 1990, additional design and operations information for the desalination plant, and results from a separate Desalination Project EIR Site specific information from the Draft and Final Desalination Project EIR will be incorporated into the Final Water Supply Project EIR/EIS, scheduled for mid-1992. The District goal is to select the project that best balances the project cost, water supply reliability,

inundation impacts, benefits to the lower Carmel River and other environmental impacts. A brief description of why the other alternatives were deemed as unacceptable overall is presented below.

The 9,000 AF New Los Padres Reservoir/Desalination (9 NLP/D) would have less inundation impacts than the 16 NLP/D alternative, would not require the relocation of the Ventana Wilderness boundary, and would provide an adequate water supply because of its aggressive operation to maximize water supply. However, 9 NLP/D would have the most significant adverse effects on the Carmel River downstream of the dam site, especially in the lower Carmel Valley between the Narrows and the Lagoon. Significant adverse effects would be similar to the existing situation, and many could not be mitigated to a less than significant level. They include impacts to hydrology (lack of streamflow), riparian vegetation and wildlife habitat, lagoon habitat and wildlife, fish (steelhead life cycle), visual resources and river-based recreation.

The 23,000 AF New San Clemente Reservoir (23 NSC) would provide generally adequate water supply performance, but water shortages would occur during extended critical dry periods. The inundation impacts of the 23 NSC would be more adverse than for the 24 NLP alternative (located further upstream) because of the quantity of high quality riparian habitat that exists below San Clemente Dam. In addition, failure of the proposed fish passage facilities would be of more serious consequences at the New San Clemente dam site, the existing Los Padres Dam already acts as a block to fish passage, and the proposed fish passage facilities included with the New Los Padres alternative are expected to be a substantial improvement. Also, the larger sizes of Los Padres Dam would provide instream flow benefits to six more miles of the Carmel River than flow released from New San Clemente Dam.

The 6,000 AF Cachagua Creek Reservoir/Desalination (6 CAC/D) is not considered as a feasible alternative due to the high cost per acre-foot of incremental yield and logistical problems stemming from the fact that this alternative is outside of the District boundaries. The Carmel River would be dry for at least five months each year in the lower Carmel Valley, with associated adverse riparian, lagoon and fishery impacts. In addition, it would inundate seven private residences.

The 11,000 AF San Clemente Creek Reservoir (11 SCC) is not considered as a feasible alternative due to poor water supply performance and the high cost per acre-foot of incremental yield. The Carmel River would flow year-round most of the time with this alternative, with associated riparian and lagoon benefits. However, there would be adverse impacts to some parts of the steelhead life cycle. In addition, the 11 SCC has the highest probability of inundating spotted owl habitat. It would also inundate a private recreational development.

The 10,500 AF Chupines Creek Reservoir (10 CHU) is not considered as a feasible alternative due to poor water supply performance and the high cost per acre-foot of incremental yield. Logistical constraints are also a factor because this alternative lies outside of the District's boundaries The Carmel River would flow year-round in normal years only with this alternative, with associated riparian and lagoon benefits. However, there would be adverse impacts to some parts of the steelhead life cycle. In addition, it would inundate significant cultural resources and a private ranch.

The 25,000 AF Cañada Reservoir (25 CAN) is not considered as a feasible alternative due to extremely high cost. The 25 CAN would be more than twice as expensive as any other alternative, with an estimated capital cost of about $278 million The flow regime would be similar to the existing situation, with a dry river for at least five months each year. There would be significant adverse impacts to the Carmel River hydrology and all facets of the steelhead life cycle. Because this alternative involves pump storage with no natural inflow, it would be vulnerable to a disruption of electric power service during winter storm periods. The site of the proposed reservoir is adjacent to a planned residential development.

Even though its simulated water supply performance is excellent, the 7 MGD Desalination Project (7 DSL) is not considered as a feasible alternative in this EIR/EIS due to numerous cost uncertainties and questionable site availability for a project of this size. Logistical constraints are also a factor because this alternative lies outside of the District boundaries. The flow regime would be similar to the existing situation, with a dry river for at least four months each year. There would be significant adverse impacts to the Carmel River hydrology, riparian and lagoon habitat, and all facets of the steelhead lifecycle. The 7 DSL does not allow for effective conjunctive use

of the water resources. In addition, the water supply would be vulnerable to disrupted electric power service (i.e., after a seismic event) and would face uncertainty with regards to future power costs. In contrast, the New Los Padres Reservoir would provide water supply by gravity flow.

As noted previously, the No Project alternative (NO PRJ) does not meet water supply performance goals, and results in unavoidable significant adverse effects to riparian habitat and fisheries of the lower Carmel River, as documented in the Water Allocation Program Final EIR.[2]

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1. MPWMD. Final Environmental Impact Report, Water Allocation Program (SCH 87030309). April 1990.

2. Ibid.

21. STATUTORY SECTIONS

21.1 INTRODUCTION

The California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) both require that various summary statements addressing specific topics be discussed within all Environmental Impact Reports and Environmental Impact Statements (EIR/EISs). The CEQA- and NEPA-mandated impact overview requirements discussed in this chapter include unavoidable significant adverse effects, cumulative impacts, relationship between short-term uses of the environment and long-term productivity, and irreversible or irretrievable commitment of resources. The effects on the Monterey Peninsula area from growth are discussed in Chapter 19, while Chapter 20 identifies the least damaging and overall preferred alternatives.

21.2 UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

The CEQA guidelines require that significant environmental effects that cannot be avoided must be identified in an EIR. Section 15382 of the CEQA guidelines state that a "significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. The guidelines also indicate that "an ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting." Because few definitive criteria exist as to what would be considered a "significant" impact, the best professional judgment is used in this EIR/EIS.

In making the judgment of significance, it was assumed that to be judged "significant and unavoidable," an adverse impact would have to involve a permanent or substantial temporary degradation in the quality of the environment, or the destruction of important natural and cultural resources that cannot be prevented by the incorporation of mitigation measures. Standards of significance are presented throughout the EIR/EIS, and judgments of significance are presented

both before and after mitigation. In some cases, mitigation measures are presented, but impacts would still remain significant and unavoidable. The term "potentially unavoidable" refers to the situation where the suggested mitigation measures can possibly reduce impacts to a less than significant level, but success must be confirmed by additional studies. Table 21-1 summarizes the potentially significant and unavoidable (PSU) and significant and unavoidable (SU) impacts for each alternative that would occur with demand at buildout levels (23,080 AF annual Cal-Am production).

Construction

Each of the reservoir alternatives would involve unavoidable significant impacts with respect to traffic, noise and air quality that would result from dam construction activities. The roadways in the vicinity of the construction sites are already congested, and the additional construction traffic would exacerbate the existing situation for about two to four years, depending on the alternative. The proposed dam sites are rural in nature with low ambient noise levels; dam construction would elevate noise levels for the duration of construction. Dam construction would also generate dust, vehicular exhaust emissions, and combustion emissions from the burning of vegetation, all of which would be considered unavoidable and significant impacts. However, these construction impacts, while significant, would not be permanent. Construction of the Cañada Reservoir would consume 10 times more energy than any other alternative due to the large amount of earthen material that would be imported by truck, an impact which is considered unavoidable and significant. The significance of adverse construction impacts associated with desalination plant construction at two alternative sites will be addressed in a separate EIR.

Each alternative would have additional significant impacts, some of which would be unavoidable. These are described in the following paragraphs for each alternative.

Hydrology

The 9 NLP/D, 6 CAC/D, 25 CAN, 7 DSL and No Project alternatives would have an unavoidable significant effect on Carmel River streamflow, with a dry river for at least five months, even in normal rainfall years. Lack of river flow in the lower Carmel Valley would also adversely affect the Carmel River Lagoon, visual resources and recreational opportunities. Adequate streamflow could not be provided with these alternatives due to limited storage capacity or lack of a connection to the Carmel River. The Cañada Reservoir alternative would also result in a poten-

TABLE 21-1

SUMMARY OF POTENTIALLY UNAVOIDABLE AND UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Alternative	Environmental Impact of Alternative	Significance
24 NLP	Reduced opportunity for steelhead upstream migration compared to natural conditions	PSU
	Reduced flow for steelhead spawning habitat compared to natural conditions	PSU
	Traffic, air quality and noise during project construction	SU
16 NLP/D	Reduced opportunity for steelhead upstream migration compared to natural conditions	PSU
	Traffic, air quality and noise during project construction	SU
9 NLP/D	Reduced opportunity for steelhead upstream migration compared to natural conditions	SU
	Reduced flow for steelhead spawning habitat compared to natural conditions	PSU
	Inundation of steelhead rearing habitat	PSU
	Discontinuous Carmel River streamflow affects hydrology, Carmel River lagoon, and recreation	SU
	Degradation of riparian habitat in lower Carmel Valley due to groundwater drawdown; affects wildlife and visual resources	PSU
	Traffic, air quality and noise during project construction	SU
23 NSC	Reduced opportunity for steelhead upstream migration compared to natural conditions	PSU
	Reduced flow for steelhead spawning habitat compared to natural conditions	PSU
	Traffic, air quality and noise during project construction	SU

PSU = Potentially significant and unavoidable, mitigation measures would possibly reduce impacts to a less than significant level, but success must be confirmed by additional studies.
SU = Significant and unavoidable, mitigation measures are not possible, or would reduce impacts somewhat, but not to a less than significant level

TABLE 21-1 (Continued)

Alternative	Impact	Significance
	Discontinuous Carmel River streamflow affects hydrology, Carmel River lagoon, and recreation	SU
6 CAC/D	Reduced opportunity for steelhead upstream migration compared to natural conditions	SU
	Reduced flow for steelhead spawning habitat compared to natural conditions	PSU
	High river temperature effects on steelhead	SU
	Degradation of riparian habitat in lower Carmel Valley due to groundwater drawdown; affects wildlife and visual resources	PSU
	Inundates seven private residences	SU
	Traffic, air quality and noise during project construction	SU
11 SCC	Reduced opportunity for steelhead upstream migration compared to natural conditions	SU
	Reduced flow for steelhead spawning habitat compared to natural conditions	PSU
	May inundate threatened spotted owl habitat	PSU
	Inundates private recreational development	SU
	Traffic, air quality and noise during project construction	SU
10 CHU	Reduced opportunity for steelhead upstream migration compared to natural conditions	SU
	Reduced flow for steelhead spawning habitat compared to natural conditions	PSU
	Discontinuous Carmel River streamflow in dry and critically dry years	SU
	Inundation of Carmel Valley Malacothrix, a plant species of special concern	SU
	Inundates a working cattle ranch and residence	SU
	Traffic, air quality and noise during project construction	SU

TABLE 21-1 (Continued)

Alternative	Impact	Significance
	Inundates significant cultural resources	PSU
25 CAN	Reduced opportunity for steelhead upstream migration compared to natural conditions	SU
	Discontinuous Carmel River streamflow affects hydrology, Carmel River Lagoon, and recreation	SU
	Risk of seawater intrusion due to chronic drawdown of Seaside Coastal Groundwater Basin	PSU
	Traffic, air quality, noise and energy use during project construction	SU
7 DSL	Reduced opportunity for steelhead upstream migration compared to natural conditions	SU
	System operations impair ability of steelhead to pass over existing dams due to lack of flow	PSU
	Discontinuous Carmel River streamflow affects hydrology, Carmel River Lagoon, and recreation	SU
	Degradation of riparian habitat in lower Carmel Valley due to groundwater drawdown; affects wildlife and visual resources	PSU
	Energy consumption equivalent to 10,800 homes	SU
	Site-specific construction impacts to be assessed in a separate EIR	--
NO PRJ	Reduced opportunity for steelhead upstream migration compared to natural conditions	SU
	System operations impair ability of steelhead to pass over existing dams due to lack of flow	PSU
	Discontinuous Carmel River streamflow affects hydrology, Carmel River Lagoon, and recreation	SU
	Degradation of riparian habitat in lower Carmel Valley due to groundwater drawdown; affects wildlife and visual resources	PSU

tially unavoidable risk of seawater intrusion in the Seaside Coastal area due to chronic groundwater drawdown. Unlike other alternatives, simulated water levels with the 25 CAN alternative would not recover to normal levels over several decades.

Carmel River Steelhead Population

The Carmel River flow regime resulting from all of the alternatives would reduce opportunities for adult steelhead upstream migration in winter, compared to natural conditions. This impact would be potentially unavoidable for the largest mainstem reservoir alternatives (24 NLP, 16 NLP/D and 23 NSC), and unavoidable for the remaining alternatives. The suggested mitigations entail operation changes that would likely be more successful with a larger mainstem reservoir due to greater storage capacity and ability to release flow into the Carmel River.

Operations of all mainstem and tributary reservoirs would result overall in potentially unavoidable significant impacts to steelhead spawning habitat, compared to natural conditions. The 9 NLP/D would also have a potentially unavoidable impact on steelhead rearing habitat because flows that might increase habitat downstream of the dam would not compensate for the inundation effects of the reservoir. Additional studies would need to be performed to confirm whether operation changes would reduce these impacts to less than significant levels.

Cal-Am system operations that are a part of the 7 DSL and No Project alternatives would result in a potentially significant adverse effect to fish passage, because adequate flow would not be available for fish to safely pass over the existing dams on the Carmel River. Additional studies would need to be performed to confirm whether operation changes would reduce these impacts to less than significant levels. Similarly, the operation of the 6 CAC/D alternative would have an unavoidable adverse effect on river temperature, which could be harmful to steelhead. Reservoir storage capacity would be too small to correct this problem.

Vegetation and Wildlife

The 9 NLP/D, 6 CAC/D, 7 DSL and No Project alternatives would result in potentially unavoidable adverse effects to about 110 acres of riparian vegetation and wildlife habitat in the lower Carmel Valley due to groundwater drawdown. Mitigation measures such as irrigation and revegetation, as documented in the Water Allocation Program Final EIR, may or may not reduce impacts to a less

than significant level. Monitoring over a number of years will be necessary to confirm mitigation success.

The Chupines Creek Reservoir would have an unavoidable adverse impact to the Carmel Valley Malacothrix, a plant species of special concern, because a unique population would be inundated.

Energy

Construction of Cañada Dam would result in a significant impact on energy consumption because of the large amount of earthen materials that would need to be imported to the site, construction of Cañada Dam would consume about 10 times as much energy as the other alternatives. Operation of the 7 MGD desalination plant would consume about 24,900 MWH of electricity per year (the energy equivalent of about 10,800 people annually), this would be considered an unavoidable significant impact.

Cultural Resources

The Chupines Creek Reservoir would inundate both historic and prehistoric cultural resources. the 1848 Trescony Homestead and three known prehistoric sites (two of which are described as large occupation sites). Because of the significance of these cultural resources and the uncertainty of mitigation, this would be considered an unavoidable significant impact.

Land Use, Planning and Recreation

The Cachagua, San Clemente and Chupines Creek Reservoir alternatives would inundate 7 private residences, a private recreational development, and a cattle ranch preserved under the Williamson Act, respectively. Loss of private homes, land and businesses would be an unavoidable adverse effect of these three projects, even though the property owner would be compensated for the loss.

The alternatives associated with inadequate Carmel River streamflow (9 NLP/D, 6 CAC/D, 25 CAN, 7 DSL and NO PRJ) would all have unavoidable significant impacts with respect to river-based recreational opportunities in the lower Carmel Valley. Activities such as rafting, swimming, and fishing would be adversely affected due to the lack of streamflow.

21.3 CUMULATIVE IMPACTS

The CEQA guidelines require a discussion of cumulative impacts that "shall reflect the severity of the impacts and their likelihood of occurrence." The cumulative impact is defined as the change in the environment that results from adding the effect of a project to closely related past, present and reasonably foreseeable future projects. For the purposes of this EIR/EIS, the discussion of cumulative impacts will be discussed in terms of the Carmel River basin and the MPWMD boundaries.

The cumulative impacts of growth within the MPWMD boundaries on traffic, air quality, schools, solid waste, wastewater, and other areas are discussed in Chapter 19.

Past and present water development practices within the Carmel River watershed have resulted in significant impacts to the fisheries and riparian habitats of the lower Carmel Valley, as documented in the MPWMD's Water Allocation Program Final EIR.[1] The cumulative effects on the Carmel River basin from past and present water gathering practices (including the construction and operation of the two existing dams (San Clemente and Los Padres) and of groundwater pumping within the lower Carmel Valley) have been an alteration of the volume and timing of the streamflow, a dewatering of the lower river during dry periods, a continuing loss of riparian vegetation, adverse effects on anadromous fisheries from the altered flow regime, and destabilization of the river banks as a result of the loss of vegetation.

The cumulative effects on the Carmel River basin that would occur from the implementation of one of the alternatives analyzed in this document would be the increased human manipulation of the water resources of the river. Dam construction would convert existing river habitat into lake habitat. However, the existing adverse impacts resulting from the dewatering of the lower river would be improved to varying degrees by most of the project alternatives.

The overall preferred alternative, a New Los Padres Reservoir in the range of 16,000 to 24,000 AF, would greatly improve the conditions in the lower Carmel Valley for fisheries and riparian habitats. The new reservoir would be expected to improve fish passage at the existing Los Padres Dam, and provide flows that would improve passage over the existing San Clemente Dam. It would, however, contribute to the cumulative loss of natural riparian habitat within the reservoir area. This would

be mitigated so there would be no net loss of in-kind habitat values, but would still constitute a loss of native riparian habitat.

21.4 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

None of the alternative examined in this document would be expected to produce short-term gains at the expense of long-term productivity. The overall preferred alternative (a New Los Padres Reservoir in a size range of 16,000 to 24,000 AF) would be expected to enhance the long-term productivity of the environment, compared to the existing conditions whereby the lack of flow in the lower Carmel River is causing significant adverse impacts to the riparian vegetation and fisheries resources.

The larger mainstem and tributary reservoirs (24 NLP, 16 NLP/D, 23 NSC, 11 SCC, 10 CHU) would not be expected to produce short-term gains at the expense of long-term productivity because (1) inundation impacts (namely the loss of riparian vegetation) would be mitigated to a less than significant level by physically enhancing degraded habitat in the lower Carmel Valley, and (2) the generally year-round stream flows that would result from the operation of these alternatives would improve the existing degraded conditions for fish and riparian habitat in the lower Carmel Valley. Overall, the biological productivity and diversity within the Carmel River basin would be expected to increase with the implementation of one of these alternatives.

Implementation of one of the remaining alternatives (9 NLP/D, 6 CAC/D, 25 CAN, 7 DSL, NO PRJ) would have lesser direct effects (i.e. lower habitat loss from inundation) but would result in the continued degradation of the aquatic and riparian habitats in the lower Carmel Valley. While not necessarily constituting a short-term use of the environment, implementation of one of these alternatives would result in an overall reduction in the long term biological productivity and diversity within the Carmel River basin.

21.5 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Implementation of any of the alternatives analyzed in this document would result in an irretrievable commitment of the human labor necessary for the design and construction of the project, and the irreversible loss of all of the energy (from 105 to 1,330 billion BTUs) and most of the materials involved in project construction. Operation of a desalination plant or pumped storage facilities

represents an irretrievable commitment of the energy used (an average of 2,800 to 24,900 MWH per year) for the production of potable water.

Reservoir construction essentially commits up to 2.7 miles of stream channel to a lake or water storage environment, although it would be possible (albeit expensive) to remove a dam and restore the existing river environment. Reservoir inundation would result in a loss of up to 64 acres of riparian vegetation and up to a total of 275 acres of all types of vegetation. Riparian vegetation mitigation measures would, however, result in no net loss of in-kind habitat value in the basin as a whole; other unavoidable biological losses are summarized in Table 21-1.

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1 Monterey Peninsula Water Management District, Final Environmental Impact Report, Water Allocation Program, SCH # 87030309, April 1990

22. PUBLIC INVOLVEMENT

22.1 PUBLIC INVOLVEMENT

The District has integrated extensive public involvement into the planning process for its long-term Water Supply Project EIR/EIS. Public involvement has taken several different forms including public hearings, workshops and District Board meetings at which the public were offered an opportunity to comment. A complete listing of public meetings and an indication of the topics covered is contained in Table 22-1. The table begins in June 1987, a list of prior public meetings may be found in Chapter 20 of the 1987 Draft EIR/EIS on the New San Clemente Project.

22.2 INTERAGENCY GROUP AND TECHNICAL SUBCOMMITTEE

The District had extensive interaction with representatives of state and federal regulatory and resource agencies who are interested in the project. This interaction took the form of three interagency group meetings in 1988 and 1989, which were chaired by Rep. Leon Panetta. In addition, seven interagency technical subcommittee (ITC) meetings (including one field trip) were held in 1988 and 1989 to review the alternatives evaluations, develop criteria for the "least damaging" alternative, and provide early drafts of reports to review. Other ITC activities included participation on Habitat Assessment and Instream Flow teams, and regular communiciation by phone or memoranda. Federal interagency group members included the U S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Forest Service and the Environmental Protection Agency. State interagency group members included the California State Water Resources Control Board, California Department of Fish and Game, and California Department of Water Resources.

22.3 REGULATORY REVIEW

Many government agencies are expected to review this EIR/EIS. Copies of the EIR/EIS will be sent to the following agencies for their consideration.

FEDERAL AGENCIES

- Advisory Council on Historic Preservation
  Washington, D.C.
- Agriculture Stabilization and Conservation Service
  Davis, CA
- Forest Service
  San Francisco, CA
- Soil Conservation Service
  Davis, CA
- National Oceanic and Atmospheric Administration
  Washington, D.C.
- Department of Energy
  Washington, D.C
- Environmental Protection Agency,
  Washington, D.C.
- Environmental Protection Agency
  San Francisco, CA
- Federal Emergency Management Agency
  Washington, D C.
- Federal Emergency Management Agency
  San Francisco, CA
- Department of Health and Human Services
  Washington, D.C.
- Department of Housing and Urban Development
  San Francisco, CA
- Department of the Interior
  Washington, D.C.

- o U.S. Coast Guard
  Alameda, CA
- o Federal Highway Administration
  San Francisco, CA
- o U.S. Fish and Wildlife Service
  Sacramento, CA
- o National Marine Fisheries Service
  Santa Rosa, CA
- o U.S. Army
  Fort Ord, CA

STATE AGENCIES

- o California State Water Resources Control Board
- o California Department of Fish and Game
- o California Department of Water Resources, Division of Safety of Dams
- o California Regional Water Quality Control Board — Central Coast Region
- o California Department of Transportation
- o California Department of Boating and Waterways
- o California Department of Forestry
- o California State Office of Historic Preservation
- o California Department of Parks and Recreation
- o California Air Resources Board
- o California Department of Health Services
- o California Coastal Commission
- o California Department of Conservation
- o Native American Heritage Commission

REGIONAL AND LOCAL AGENCIES

- o County of Monterey
- o Monterey Bay Unified Air Pollution Control District
- o Association of Monterey Bay Area Governments

- Cities of Carmel-by-the Sea, Monterey, Seaside, Pacific Grove, Del Rey Oaks and Sand City
- Regional Water Quality Control Board

TABLE 22-1

MPWMD WATER SUPPLY PROJECT PUBLIC INVOLVEMENT

Date	Type[1]	Topic
June 8, 1987	BM	1. Adopt resolution calling for advisory vote on New San Clemente Project
July 13, 1987	BM	1. Revise advisory ballot resolution
August 8, 1987	BM	1. Authorize preparation of EIR Supplement in newspapers
September 14, 1987	BM	1. Receive New San Clemente Project Draft EIR/EIS and approve Notice of Completion; begin 54-day comment period 2. Pass resolution endorsing approval of advisory ballot measure for the New San Clemente Project
October 19, 1988	BM/W	1. Receive oral comments on Draft EIR/EIS
October 20, 1988	BM/W	1. Receive oral comments on Draft EIR/EIS
November 9, 1988	BM/PH	1. Receive oral comments on Draft EIR/EIS
December 14, 1988	BM	1. Review oral and written comments on Draft EIR/EIS 2. Review workplan to respond to comments
January 11, 1988	BM	1. Review federal and state permit processes 2. Review EIR/EIS process and schedule 3. Board determines that a Supplemental Draft EIR/EIS will be prepared and the alternatives evaluation will be repeated.
January 21, 26, 1988	BM/W	1. Policy issues for revised EIR/EIS, develop revised alternatives selection process and criteria
February 8, 1988	BM	1. Retain consultants to revise demand projections 2. Describe role of new wells in upper Carmel Valley for No Project
March 14, 1988	BM	1. Approve Phase I work program for revised EIR/EIS
April 1, 1988	BM/PH	1. Ordinance authorizing expenditure of capital projects fund for EIR/EIS studies

Table 22-1 (Continued)

Date	Type[1]	Topic
May 9, 1988	BM	1. Acceptance of estimates of housing and employment of buildout
May 25, 1988	BM/W	1. Part I evaluation of alternatives
June 13, 1988	BM	1. Review of city and county comments on buildout projections 2. Amend Part I evaluation report 3. Develop estimates of water demand at buildout
July 11, 1988	BM	1. Revise project purpose for 404 permit application 2. Revise criteria for Part II alternatives evaluation
October 10, 1988	BM	1. Acceptance of Habitat Assessment Report
October 20, 1988	BM/W	1. Part II evaluation of alternatives
December 12, 1988	BM	1. Authorize geotechnical and engineering studies for Los Padres and San Clemente Creek sites
February 13, 1989	BM	1. Retain consultants to assess impacts of New San Clemente, San Clemente Creek, New Los Padres, Chupines Creek and Cachagua Creek sites 2. Approve riparian mitigation concept with Regional Park District 3. Presentation on Canada Reservoir concept by Cal-Am
February 15, 1989	BM/W	1. Symposium on Water Supply Project
March 2, 1989	BM	1. Review of February 15 Interagency Group meeting 2. Select 24,000 AF New Los Padres Dam as proposed project 3. Select Canada Reservoir as an alternative in the EIR/EIS
March 13, 1989	BM/PH	1. Amend MPWMD law to shorten approval process for water supply projects 2. Authorize survey of Ventana Wilderness boundary
April 10, 1989	BM/PH	1. Consider agreements between District and pumpers to dismiss water rights protests 2. Approve IFIM fishery study between existing dams
May 5, 1989	BM/W	1. Symposium on "State of the District"

Table 22-1 (Continued)

Date	Type[1]	Topic
May 8, 1989	BM	1. Reception of lower Carmel Valley groundwater analysis 2. Amend alternatives to be analyzed in revised EIR/EIS 3. Receive cost estimates for New Los Padres and San Clemente Creek sites.
June 12, 1989	BM	1. Review status, timeline for Canada Reservoir and coordination with Cal-Am regarding studies
August 14, 1989	BM	1. Receive final report on preliminary designs and cost estimates for New Los Padres and San Clemente Creek sites 2. Approve endangered species survey for Smith's Blue butterfly
September 11, 1989	BM	1. Receive lagoon mitigation recommendations 2. Amend non-dam alternative to include desalination
February 26, 1990	BM	1. Receive Canada Reservoir ownership options report
March 12, 1990	BM	1. EIR/EIS status and timeline
July 23, 1990	BM	1. Status of legislation to amend Ventana Wilderness boundary
August 8, 1990	BM/W	1. Status of Canada project 2. Final assumptions for Supplemental Draft EIR/EIS
August 27, 1990	BM	1. Receive IFIM fishery study
October 22, 1990	BM	1. Report on Ventana Wilderness land exchange
November 5, 1990	BM	1. Certification of Water Allocation Program EIR; adoption of long-term mitigation program
December 13, 1990	BM	1. Authorize IFIM study downstream of San Clemente Dam
January 28, 1991	BM	1. Authorize desalination feasibility study contracts
March 25, 1991	BM	1. Authorize addition of 16,000 AF New Los Padres Reservoir plus 3 MGD desalination for analysis in EIR/EIS

Table 22-1 (Continued)

Date	Type[1]	Topic
May 20, 1991	BM	1. Selection of preferred desalination project sites.
June 27, 1991	W	1. Receive public scoping comments on Desalination EIR.
July 22, 1991	BM	1. Receive Final Desalination Feasibility Study.

[1]BM = Full Board Meeting
W = Public Workshop
PH = Public Hearing

23. LIST OF PREPARERS

This document was prepared by the Monterey Peninsula Water Management District under the direction of Mr. James Cofer, General Manager, and Mr. Bruce Buel, former General Manager. Technical assistance was provided by EIP Associates, under the direction of John A. Davis, Mr. Roger Golden of the U. S. Army Corps of Engineers provided further technical assistance.

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24. GLOSSARY OF TERMS

6 CAC/D: 6,000 AF Cachagua Creek Reservoir with 3 MGD Desalination plant alternative.

7 DSL: 7 MGD Desalination alternative.

9 NLP/D: 9,000 AF New Los Padres Reservoir with 3 MGD Desalination plant alternative.

10 CHU: 10,500 AF Chupines Creek Reservoir alternative.

11 SCC: 11,000 AF San Clemente Creek Reservoir alternative.

16 NLP/D: 16,000 AF New Los Padres Reservoir with 3 MGD Desalination plant alternative.

23 NSC: 23,000 AF New San Clemente Reservoir alternative.

24 NLP: 24,000 AF New Los Padres Reservoir alternative.

25 CAN: 25,000 AF Cañada Reservoir alternative.

Acclimation: The process of adjusting fish a new set of environment conditions.

Acre-foot (AF): The volume of water (325,851 gallons) that would cover one acre to a depth of one foot.

ADT: Average daily traffic volume.

Air Quality Management Program/Plan: A federally-mandated plan identifying strategies for controlling air pollution.

Alevins: The developmental stage of salmonid fishes in which the yolk sac has not been fully absorbed and in which the fish lives in the nest prior to emerging as fry.

Allocation Program. The allotment of water resources by the District that contains the following three components. (1) A limit on how much total water may be produced annually from the Monterey Peninsula Water Resource System, given the need to protect instream fish and wildlife resources, protect riparian resources, provide for drought protection, and prevent seawater intrusion, (2) A scheme for allocating Cal Am water to each of the jurisdictions within the Cal-Am service area, (3) A set of mechanisms for monitoring jurisdictional water use, ensuring

jurisdictional compliance with the allocation scheme, and making adjustments to the allocation scheme over time.

Alluvial: Relating to, composed of, or found in clay, silt, sand, gravel, or similar material deposited by running water.

Alluvium: Sedimentary formation composed of clay, sand, gravel and other materials moved by streams and deposited by them.

AMBAG: Association of Monterey Bay Area Governments.

Anadromous fish: Any species that lives as an adult in the ocean and returns to freshwater to spawn (e.g., steelhead, salmon, striped bass, American shad).

AQ1: Subbasin of the Carmel Valley Aquifer extending westward from San Clemente Dam to Robles del Rio gaging station.

AQ2: Subbasin of the Carmel Valley Aquifer extending from Robles del Rio gaging station to the Narrows.

AQ3: Subbasin of the Carmel Valley Aquifer extending from the Narrows to Near Carmel gaging station.

AQ4: Subbasin of the Carmel Valley Aquifer from Near Carmel gaging station to the river mouth.

Aquifer: Stratum or zone below the surface of the earth capable of producing water from a well.

Aquifer drawdown model: A computer code used to simulate the changes in depth to groundwater.

Armoring: In a river bed, a phenomenon resulting from fine sediments being washed out, leaving a surface layer of gravel, cobbles and boulders which prevent erosion of the river bed except during the largest floods.

Attenuate: In hydrology, to spread a given flood event over a longer period of time. This results in a reduction of the peak streamflow rate.

Attraction flows: Pulses of high flow from the rivermouth which are sufficient to break open the sandbar and attract steelhead from the ocean into freshwater.

Bed load: Soil, gravel, rock or other material rolled along the bottom of a stream by moving water, as contrasted with sediment carried in suspension above the stream bed (see suspended load).

Board: The Monterey Peninsula Water Management District's seven-member Board of Directors. Five are elected at large; two are appointed public officials, typically a mayor or County supervisor, who serve within the District.

Brackish water: A mixture of sea water and fresh water.

Brood: Fish born in the same year.

Buildout: The maximum unconstrained development of all allowable growth, as defined by General Plans, zoning and other policies of cities and County areas within the District boundaries.

Cal-Am: California-American Water Company, a privately owned and operated water company, which is the largest of the water distribution systems located within the MPWMD boundaries.

Caltrans: California State Department of Transportation.

Carmel River Management Program/Plan (CRMP): A 10-year plan adopted by the District in 1983 to manage erosion along the banks of the Carmel River between Carmel Bay and Klondike Canyon.

CDF: California Department of Forestry and Fire Protection.

CDFG: California Department of Fish and Game.

Cenozoic: Geologic era from approximately 65 million years ago to the present. The Cenozoic era is divided into two periods: The Tertiary and Quaternary.

CEQA: California Environmental Quality Act.

cfs: Cubic feet per second.

Clearing: The removal of trees and brush from an area such as a construction site or reservoir inundation area. For construction projects, clearing typically refers to a removal of all standing brush or trees two inches or greater in diameter at a point six inches above the ground or any vegetation greater than six feet in height (see grubbing).

Climax community: A more or less stable biotic community.

CNDDB: California Natural Diversity Data Base.

CO: Carbon monoxide, a gaseous compound containing one molecule of carbon and one of oxygen.

Coastal dune: Vegetation community found grown on the sandy dunes just inland from the coast.

Colluvium: A general term applied to loose and incoherent deposits, usually at the foot of a slope or cliff and brought there chiefly by gravity.

Conjunctive use: The coordinated use of various water sources, such as surface water, groundwater and desalinated seawater, managed so that the benefit from the overall water resource system is maximized. Conjunctive operation provides a greater sustained yield from a system than would otherwise be possible, usually at a lower cost.

Conservation. Mechanical or behavioral reductions in potable water conservation resulting from a structured program.

CPUC: California Public Utilities Commission.

Critical riffle: A riffle which acts as a barrier to the migration of steelhead under low flow conditions.

CRSA: Carmel River Steelhead Association.

CVSIM: Carmel Valley Simulation Model.

Denil ladder: A short, relatively steep fish ladder with baffles place at an angle less than 90 degrees in relation to the slope of flow down the ladder. The baffle dissipates energy and provides a solid column of water in which the fish can migrate upstream.

Desalination: The separation of water from dissolved impurities whereby nearly pure water is recovered from source water such as seawater, brackish water or wastewater.

Desiccation: The act of drying-up.

Discontinuous stream: A stream which has a segment or segments in which the water flows beneath the stream bed and does not occur as surface flow.

District: Monterey Peninsula Water Management District.

Drawdown: A decrease in the elevation of the water table of an aquifer in response to pumping.

Drought: For the Monterey Peninsula Water Resources System, a drought is defined as two or more consecutive dry or critically dry years. The determination is based on unimpaired inflow at the San Clemente Dam site and selected flow frequency values.

Drought reserve: Water that is not available for allocation or use reserved to minimize water supply shortfalls during times of drought. The drought reserve is not a discrete supply of water, but is a method of calculating water which would be available for use during a drought.

Drought-tolerant species: Plants that are tolerant of low soil moisture conditions for extended periods of time.

Drought year yield: As used in this document, the average of the simulated production in the California-American Water Company system for a given project alternative in water years 1977 and 1990.

Dry season: The period of the year with the lowest rainfall; generally from May to October.

DWR: California Department of Water Resources.

EIR/EIS: Environmental Impact Report/Environmental Impact Statement

Emergence: The process whereby fry actively swim from the confines of their gravel nest into the water column above the substrate.

Epilimnetic: Referring to the warmer, upper portion of a lake or reservoir above the metalimnion.

Evapotranspiration: The loss of water from the soil by both evaporation and by transpiration from the plants growing thereon.

Exceedence frequency: The number of times that a particular value will be equalled or exceeded during a specific series of events.

Extractable storage: Aquifer storage that can be physically removed.

Fingerling steelhead: Juvenile steelhead which are about 75 mm in length and usually less than 1 year old.

Fiscal year: The period from July 1st of one calendar year to June 30th of the following calendar year.

Fish screen: A device used to separate fish from a large flow of water or to keep fish from moving into a specific area.

Fish separator: A device for separating a mixtures of different sized fish into discrete groups based on size.

Forb: Broad-leafed, annual or herbaceous perennial plant species

FRB: Future Reference Baseline. In this document, the No Project alternative facilities with water demand of 23,080 AF annual Cal-Am production.

Fry: Very small, recently-hatched steelhead. The term is commonly applied to fish up to about a month old and 1-1/2 inches long.

Gabion structure: A series of wire baskets filled with rock or concrete, lashed together, and anchored in or adjacent to the stream channel.

Geohydrologic: Pertaining to the character, source, and mode of occurrence of underground water.

Geomorphic: Of, or pertaining to, the figure of the earth or the form of its surface.

Glide: Portion of stream which is the transition between pools and riffles. It is characterized by laminar, converging water flow and a gradient of accelerating water velocity from the upstream to downstream ends.

Granitic rocks: Of, or pertaining to, or composed of, granite or granite-like rock.

Groundwater: Non-saline and saline water beneath the natural surface of the ground, whether or not flowing through known and definite channels.

Groundwater basin: An interrelated set of water-bearing strata of permeable rock, sand, or gravel.

Groundwater hydrology: The study of the occurrence, distribution, character, and movement of water below the surface of the earth (synonymous with the term "Hydrogeology").

Grubbing: The removal of stumps, roots and brush from an area that has been cleared, as for a construction site or reservoir inundation area (see clearing).

Habitat area: The square footage of a specific type of habitat in a section, reach, or other unit of stream length.

Holocene: The latest epoch of the Quaternary Period, from approximately 11,000 years ago to the present.

Hydraulic conductivity: A measure of the ease with which groundwater moves through an aquifer

Hydrogeologic: Of, or pertaining to, the occurrence, distribution, character, and movement of subsurface water.

Hydrologic: Of, or pertaining to, the study of the waters of the earth.

Hydrologic record: A recorded period of hydrologic events, such as streamflow.

Hypolimnetic volume: The volume of cool hypolimnetic water in a lake or reservoir.

Hypolimnetic: Referring to the cool, deeper portions of a stratified lake or reservoir which are below the metalimnion.

Igneous Rocks: Crystalline or glassy rocks that have solidified from a molten magma, the magma may pour out onto the surface of the earth (such as lava) or may cool at depths below the surface (such as granite).

Incubation: The process referring to the development of fish eggs before they hatch into alevins.

Interim Relief Plan (IRP): A set of programs adopted by the MPWMD Board in September 1988 in recognition of the need to ameliorate environmental impacts for the period of time prior to augmentation of the water supply for the Carmel River and the Monterey Peninsula. The IRP includes programs to rescue and rear fish stranded in the Carmel River, to irrigate riparian vegetation along the Carmel River, and to release water from the San Clemente Dam.

Jurisdictions: The eight local agencies designated to receive a separate allocation in the District's Water Allocation Program. These agencies are the City of Carmel-by-the-Sea, the City of Del Rey Oaks, the City of Monterey, the City of Pacific Grove, the City of Sand City, the City of Seaside, the County of Monterey, and the Monterey Peninsula Airport District.

Juvenile steelhead: Small steelhead, less than one year old. Also called young-of-the year.

Kelts: Adult steelhead which have spawned and are migrating back to the ocean.

Lagoon: A body of shallow water, particular as is the case of the Carmel River Lagoon, one possessing a restricted connection with the sea.

Landlocked: Referring to a steelhead population or individual who cannot emigrate to the ocean due to an impassable barrier.

Landslide: The perceptible downward sliding or falling of a relatively dry mass of earth, rock, or mixture of the two.

Lithologic: Of, or pertaining to, the physical character of a rock, generally as determined without the aid of a microscope.

Long-term yield: The amount of water that can be withdrawn from an aquifer without causing long-term decline in the water table or piezometric surface. Long-term yield is roughly equal to the net recharge rate of the aquifer.

LOS: Level of service; a qualitative measure of traffic-operating characteristics defined as the ratio of volume to capacity (V/C). Roadway segments are assigned letter designations from A through F, representing progressively worsening traffic conditions.

Lower Carmel Valley: That section of the Carmel Valley downstream of the Narrows to Carmel Bay which contains Carmel Valley Aquifer Subbasins AQ3 and AQ4.

Marsh: Soft, wet areas which can include wetlands and in some instances willow scrub riparian vegetation.

Maximum Credible Earthquake (MCE): The most severe earthquake that is believed possible at a given location, based on the existing geological and seismological evidence.

MBUAPCD: Monterey Bay Unified Air Pollution Control District.

Mean daily flow: The average streamflow during a particular day, midnight to midnight, at a given location (usually expressed as cubic feet per second (cfs) or acre-feet per day). For the streamflow analysis in this document, mean daily flow is computed by dividing the monthly volume by the number of days in the month and converting to cfs.

Mean monthly flows: Average flow volumes for a given month for the simulated period (1902-1990)

Mesic: Moist.

Mesozoic: Geologic era from approximately 225 to 65 million years before present. The Mesozoic era is divided into three periods.

Metalimnetic: Referring to the zone of stratified lake or reservoir where density and usually temperature of water changes rapidly with increasing depth, also known as the thermocline.

Metamorphic Rocks: Rocks which are changed by the action of heat and/or pressure below the earth's surface. Changes brought about by metamorphism can be in the rock's mineral composition, texture and structure.

MGD: Million gallons per day.

Monterey County Water Conservation Plan: A plan adopted by Monterey County and the major water providers in the county that establishes water conservation goals for each area of the county.

Morphology of stream: Referring to the shape and texture of a stream channel.

MPRPD: Monterey Peninsula Regional Park District.

MPUSD: Monterey Peninsula Unified School District.

MPWMD: Monterey Peninsula Water Management District.

MPWMD Law: The District's enabling legislation (Statutes of 1977 Chapter 527, found in *West's California Water Code Appendix* § 108-1 to 122-100).

MPWMD Rules and Regulations: The collection of ordinances under which the District operates.

MPWRS: Monterey Peninsula Water Resources System. The MPWRS consists of the Carmel River, the Carmel Valley Aquifer, and the Seaside Coastal Groundwater Basin.

MRWPCA: Monterey Regional Water Pollution Control Agency.

Narrows: The location in Carmel Valley in the vicinity of Scarlett Road that separates the Upper Carmel Valley from the Lower Carmel Valley.

NEPA: National Environmental Protection Act.

NO PRJ: No Project Alternative.

No-flow periods: Periods when streamflow is non-existent

Non-Cal-Am Groundwater Users. Individual private wells or small distribution systems drawing from the Monterey Peninsula Water Resources System.

Nonusable storage: Aquifer or groundwater retained in an aquifer to repel seawater intrusion, this water is not available for withdrawal.

Normal Year Demand: Water use that would occur under normal conditions if the water supply were adequate to meet all needs. As used in this document, normal conditions are based on streamflow and range from "above normal" to "below normal" values. This range is defined by the 25th percentile and 75th percentile exceedance frequencies.

North Coast Central Air Basin: The air basin containing the Monterey Peninsula, as defined by the California Air Resources Board.

NOx: Nitrogen oxide.

Overstory: The tall, woody trees which provide the upper canopy of foliage in a forest and generally shade lower levels.

Ozone: A gaseous compound containing three molecules of oxygen; a major component of photochemical smog.

PBCSD: Pebble Beach Community Services District.

Phreatophytic: A deep-rooted plant that obtains its water from the water table or the layer of soil just above it.

Plant water stress: Loss of plant vigor or fitness caused by a low soil moisture and the resultant loss of turgor pressure and eventual wilting.

PM_{10}. Particulate matter less than 10 microns in diameter which can be inhaled and are therefore considered hazardous to human health.

Potable: Suitable for drinking.

Production: The amount of water extracted by the water distribution system from all sources of water supply.

Probable Maximum Flood (PMF): The maximum streamflow that may be expected at a given location from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

Pumping capacity: The capability of a well to produce water.

Pumping regime: The pattern of groundwater pumping.

Quaternary: Period of geologic time from approximately 2 million years ago to the present. It is the latest period within the Cenozoic era. The Quaternary Period is divided into two epochs. The Holocene and Pleistocene.

Rationing goal: The percentage reduction in water consumption that is or would be included in a water rationing ordinance.

RCC: Roller-compacted concrete.

Rearing habitat: Portions of stream which is used by juvenile steelhead while they reside in freshwater. Good quality habitat is characterized as having highly oxygenated water, summer water temperatures in the range of 55 to 65 deg F, a streambed covered with cobbles and boulders, turbulent flow conditions, water velocities of at least 0.5 feet per second, water depths greater than 0.5 feet, and vegetation or woody debris which hangs over or enters the water.

Recharge: The process by which an aquifer receives additional water from outside sources.

Reclamation. The recovery of subpotable or wastewater sources so as to substitute this supply for irrigation applications currently using potable supply.

Remnant run: A population of adult steelhead which has been severely reduced in size compared to historical or natural conditions, which is threatened, and may become endangered, if conditions which reduced the run are not corrected.

Riparian: Of, or pertaining to, the banks of a stream, lake, reservoir, or other body of fresh water.

Riparian forest: The terrestrial environs adjacent to freshwater bodies such as rivers and streams. Riparian vegetation found in these forests relies on these water bodies to provide soil moisture in excess of that otherwise available through local precipitation.

Riparian scrub: Low-growing (one- to three-meter) vegetation growing in riparian areas.

Riparian vegetation: Plants found growing at the edges of freshwater bodies. Riparian vegetation requires moist year-round soil conditions such as those found near a river.

Riparian woodland thicket: Low- to middle-canopy vegetation growing in riparian areas.

Risk/uncertainty: The concept that the occurrence of an event is not certain. Risk/uncertainty is usually expressed as probability.

Rotary drum fish screen: A cylindrical shaped fish screen which turns on a horizontal or vertical axis, thereby passing water through it, debris over or around it, and blocking the passage of fish through it.

Runoff: The movement of excess precipitation across the ground.

Salinity level: The level of salts in a body of water.

Seawater intrusion: The phenomenon occurring when sea water invades a body of fresh water.

Sedimentary budget: The input to, deposition in, and outflow of sediment in a stream system.

Sedimentary Rocks: Material that has been deposited by water, ice, wind, or chemically precipitated in water. Sedimentary rocks are usually stratified into layers or beds.

Sedimentary transport: The process by which soil, rock and debris are moved by flowing water.

Seismicity: The likelihood of an area being subject to earthquakes.

Septic system: A small sewage disposal system generally serving a single user.

Shortfall: The amount by which the monthly or annual supply, or production, is less than the corresponding demand, as calculated by the CVSIM model. When expressed as a percentage, the shortfall is a percentage of the demand.

Significant Environmental Impact: According to § 15382 of the *CEQA Guidelines*, a "significant effect on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water,

minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant."

Siliceous: Of or pertaining to silica.

Smolts: Juvenile steelhead which have physiologically adapted to live in seawater and are actively emigrating from freshwater to the ocean.

Soil column: The vertical alignment of soil.

Spawning habitat: Portions of stream which is used by female steelhead for constructing her nest. Typically, these areas are located at the downstream end of pools, just upstream of where turbulent water flows through riffles. Good quality spawning habitat is characterized by appropriate sized gravel, water velocities of at least 2 feet per second, and water depths of at least 1 foot.

Special-status plant species: Special-status plant species are defined to include species that are federally listed, proposed, or candidates for threatened and endangered status (50 CFR 37958-37967), listed by the State of California as threatened and endangered species or are candidates for listing, California Native Plant Society (CNPS) rare and endangered species.

Special-status wildlife species: Special-status wildlife species are defined to include species that are federally-listed threatened and endangered species (50 CFR 37958-37967), listed by the State of California as threatened and endangered species (California Administrative Code, Title 14, Section 670.5), identified by the Department of Fish and Game as species of special concern, or identified by the Department of Fish and Game as fully protected species in California.

SR 1: State Route 1.

SR 68: State Route 68.

SR 218: State Route 218.

Storage capacity: The total water-bearing capacity of an aquifer or surface reservoir.

Stress: The physiological response to environmental changes which is characterized by increased blood pressure, release of specific hormones, and a heightened state of activity or awareness and a reaction to flee from the change.

Sub-potable water: Water which is not fit for human consumption without treatment, including reclaimed water.

Succession: Change through time in the plant species composition of an area.

Surface flows: Water flow across the ground surface, generally in stream channels.

Suspended load: Sediment, usually clay particles, silt and fine sand, which is carried in suspension above the bottom of a stream by moving water, as contrasted with the bed load rolled along the bottom.

Swimup fry: Referring to the development stage of steelhead just after they emerge from the gravel nest and at the time they normally begin to feed on external food.

SWRCB: State Water Resources Control Board.

System capacity: The amount of water in acre-feet that a water distribution system is permitted by the District to produce annually. Capacity is based on the cumulative sustained yield of wells adjusted for periodic lowering of the water table and the projected yield of other sources of supply.

Tectonic: Of, pertaining to, or designating the rock structure and external forms resulting from the deformation of the earth's crust.

Tertiary: Period of geologic time ranging from approximately 65 to 2 million years before present. It is the earliest period within the Cenozoic era.

Thermocline: See metalimnetic.

THM: Trihalomethane.

Transportation flows: Streamflow which is sufficient to allow adult passage over critical riffles and throughout the lower river downstream of spawning habitat.

Tributary flows: Streamflows from small streams tributary to a main stream or river.

Typical dry season: An average condition relating to the portion of the year with minimum rainfall

Understory: The short, shade-tolerant, woody and herbaceous vegetation growing in the lower canopy of the forest.

Unimpaired (flow) (1) Streamflow that is unaffected by artificial diversions, imports, storage or other works of man in the stream channel. (2) Recorded streamflow, with corrections applied to remove the effects of artificial diversions, imports or storage.

Upland vegetation: Vegetation growing in areas outside wetland and riparian zones which relies solely on precipitation as its source of water.

Upper Carmel Valley: The section of the Carmel Valley above the Narrows and below San Clemente Dam which includes Carmel Valley Aquifer Subbasins AQ1 and AQ2.

Usable storage: Aquifer storage that is available for withdrawal.

USFS: United States Forest Service.

USFWS: United States Fish and Wildlife Service.

USGS: Unites State Geological Survey.

V/C: Volume to capacity ratio, a measure used to define traffic Level of Service (LOS) on a street or highway.

Vegetation die-offs: The loss of vegetation through mortality.

Water table: The surface of the groundwater in an unconfined aquifer.

Water year: The period from October 1st of one calendar year through September 30th of the following calendar year.

Water-dependent recreation: Recreation activity that requires direct contact with water.

Water-enhanced recreation: Recreation activities that do not require direct contact with water, but that area enhanced by its presence.

Watershed: The area contained within a drainage divide above a specified point on a stream.

Well: Any device or method, mechanical or otherwise, for the production of water from groundwater supplies, excluding seepage pits and natural springs.

Well perforations: The slots or openings in the casing wall of a well that allow water to enter the well.

Wetland: An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Certain federal agencies, including the U S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the U S Soil Conservation Service, have formulated varying definitions of the terms "wetland" or "wetlands" for use with various laws, regulations, and programs.

Wetland vegetation: Hydrophytic plants which can survive and grow in water-saturated or inundated conditions

Yearling-sized steelhead: Steelhead that have spent one complete summer in the stream. At the beginning of their second summer, they usually range from four to eight inches in length.

Young-of-the-year: Referring to juvenile steelhead which are less than one year old.

Zero habitat: Jargon referring to the lack of river habitat suitable to the rearing of juvenile steelhead.

Zonation: The arrangement of area within a region into strips or blocks distinguishable from each other by differences in vegetation, soils, flooding frequency, etc.

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11. CLIMATE AND AIR QUALITY

12. NOISE

13. VISUAL QUALITY

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